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E-Survey of Road users' Attitudes

Seat belt and child restraint systems

ESRA2 Thematic report No. 8

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List of Abbreviations

Country codes

AT	Austria
AU	Australia
BE	Belgium
CA	Canada
CH	Switzerland
CZ	Czech Republic
DE	Germany
DK	Denmark
EG	Egypt
EL	Greece
ES	Spain
FI	Finland
FR	France
HU	Hungary
IE	Ireland
IL	Israel
IN	India
IT	Italy
JP	Japan
KE	Kenya
KR	Republic of Korea
MA	Morocco
NG	Nigeria
NL	Netherlands
PL	Poland
PT	Portugal
RS	Serbia
SE	Sweden
SI	Slovenia
UK	United Kingdom
US	United States
ZA	South Africa

Other abbreviations

ESRA	E-Survey of Road Users' Attitudes
EU	European Union
ETSC	European Transport Safety Council
ICW	Individual country weight used in ESRA2
CRS	Child Restraint Systems
SARTRE	Social Attitudes to Road Traffic Risk in Europe
IIHS	Insurance Institutes for Highway Safety
WHO	World Health Organisation

ITF	International Transport Forum
IRTAD	International Traffic Safety Data and Analysis Group
RTC	Road traffic crash
RTMC	Road Traffic Management Corporation

Executive summary

Objective and methodology

ESRA (E-Survey of Road users' Attitudes) is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The aim is to collect and analyse comparable data on road safety performance, in particular road safety culture and behaviour of road users. The ESRA data are used as a basis for a large set of road safety indicators. These provide scientific evidence for policy making at national and international levels.

Vias institute in Brussels (Belgium) initiated and coordinates ESRA, in cooperation with eleven core group partners (BASt, BFU, CTL, IATSS, IFSTTAR, ITS, KFV, NTUA, PRP, SWOV, TIRF). At the heart of ESRA is a jointly developed questionnaire survey, which is translated into national language versions. The themes covered include self-declared behaviour, attitudes and opinions on unsafe traffic behaviour, enforcement experiences and support for policy measures. The survey addresses different road safety topics (e.g. driving under the influence of alcohol, drugs and medicines, speeding, distraction) and targets car occupants, motorcycle and moped drivers, cyclists and pedestrians.

The present report is based on the second edition of this global survey, which was conducted in 2018 (ESRA2_2018). In total this survey collected data from more than 35.000 road users across 32 countries. An overview of the ESRA initiative and the project-results are available on: www.esranet.eu.

As a follow-up to the ESRA1 project (Meesmann et al., 2017) and the previous ESRA1 thematic report (Trotta et al., 2016), this thematic ESRA2 report focusses on two specific topics: the attitudes and opinions of road users on wearing a seat belt while driving a car or as a car passenger and on the use of child restraint systems (CRS). This report analyses the following aspects: the acceptability of unsafe traffic behaviour related to the use of seat belts and CRS; self-declared (unsafe) traffic behaviours; attitudes towards unsafe traffic behaviours; support for road safety policy measures; as well as the reported police checks and perceived likelihood of getting caught for seat belt offences. The analyses provide an international comparison of 32 participating countries in four regions; furthermore, the effect of age and gender on seat belt and CRS use is examined.

Key results

Self-declared (un)safe traffic behaviour

- On a national level, great differences can be found between countries in the self-declared use of seat belt by the drivers as compared to the passengers on the rear seat, with Austria revealing the smallest and Japan the biggest difference. Overall, the rates of seat belt use for the front seats are higher than for the rear seats. Europe shows the highest seat belt use for drivers, and North America for passengers in the rear seats. The lowest drivers' seat belt rate is found within the African region and the passengers' seat belt rate in the rear seat is the lowest within the Asian and Oceanian region. As to the CRS use, the highest rates are found within the North American region and the lowest within Africa. Females report higher rates both for seat belt and CRS use in comparison to males. In the European and the North American regions, the highest seat belt and CRS use as a driver is reported by the oldest respondents.

Acceptability of unsafe traffic behaviour

- Globally, it is more largely accepted not to wear a seat belt than not to use an appropriate CRS. On a regional level, Europe presents the lowest level of self-declared acceptance for driving without a seat belt (average of 4%). On a national level, the acceptance rates in the different European countries range from 1.3% in Ireland to 8.4% in Poland. North America is the region with the lowest acceptance for not using an appropriate CRS, with an average of 1% acceptance rate. The highest acceptance for both restraint devices is found within the African region with on national level Egypt revealing the highest acceptance rates: 25.5% for failure to wear a seat belt and 21.8% for transporting children without a CRS.

Not only does the respondents' country of residence influence the level of acceptance both for the seat belt and CRS use, significant differences were also found across gender and age cohorts. Females are less likely to accept driving without a seat belt and a CRS than males. Furthermore, the oldest respondents are showing lower acceptance for not using a seat belt or a CRS in comparison to the youngest, across Europe, North America as well as Asia and Oceania. Using a seat belts for passengers in the back seats reduces the risk by 44% in comparison to passengers not wearing their seat belt (Glassbrenner & Starnes, 2009). The use of a CRS for children even reduces the risk of fatality by 50% (Schoon & van Kempen, 2012).

The European Commission (2014) describes the seat belt as a safety device that is required for all cars and available for all occupants. A CRS is a removable safety device that can be selected in a variety of types. It must be appropriately fixed to a back seat with a seat belt (system) using at least one anchorage point. The main killer behaviours in fatal road traffic crashes (RTCs) are speeding, intoxicated driving, mobile phone use while driving and not wearing a seat belt (ETSC, 2019). In accordance, the World Health Organisation's (WHO) global status report on road safety conducted in 2018 points out that not using a seat belt and not using a CRS while driving are two out of the top five behavioural reasons that increase the risk of traffic related injury or fatality (WHO, 2018).

It is estimated that 8600 car occupants across the EU survived serious RTCs in 2012 thanks to the use of seat belts (ETSC, 2014). The CRS effectiveness depends on the type of system used for different ages and the combination of CRS with or without the car's seat belt. For instance, a rear-facing CRS is significantly more effective for children under the age of 5 than a forward-facing CRS. Compared to unrestraint and without the use of a seat belt, for children between the ages of 0-4 year, a rear-facing CRS in combination with a seat belt reduces the risk of serious injury and fatality by 90%, while a forward facing CRS in combination with a seat belt reduces the risk of all injury by 55%. Furthermore, a risk reduction of 71% of severe injury for children aged 1-7 years can be achieved by using a CRS instead of a seat belt only (Elvik, 2009).

Worldwide, different regulations apply for the obligation to wear a seat belt or use a CRS. For instance, in the EU, seat belt use for all car occupants for both front and back car seats, became mandatory in the year 1991, with different initiation dates per European country (Directive 91/ 671/EEC). For example Greece implemented a seat belt law in 2003. In a later stage, compulsory application of a CRS was regulated by law in the EU, in the year 2003 (Directive 2003/20/EC). The United States applies two types of seat belt regulations; either the primary enforcement or the secondary enforcement laws, depending on the State. Primary enforcement laws are stricter, giving the police the freedom to stop any vehicle in which the occupants do not wear their seat belt. However, secondary enforcement laws permit police to penalize not wearing a seat belt only after a car is stopped for other reasons. Primary laws are active in 35 States and secondary laws in 15 States (ITF, 2018; Shults & Beck, 2012). Canada also applies primary enforcement and their seat belt regulations apply to all car occupants. Besides, Canada has strict regulations related to CRS use, with only allowing CRS with Canadian National Safety Mark and expiry date stamp (Transport Canada, 2019; WHO, 2018). Among the Asian and Oceanian region, Australia applies a seat belt regulation for all car occupants, but not for bus passengers or slow moving vehicles, besides the laws differ by State. Furthermore, both India and Japan currently have seat belt regulations that apply for all occupants, but Japan only requires seat belt use for back seat and for bus passengers since 2008 (WHO, 2018). The African region is found to have the least strict regulations, with Morocco and Egypt having a law requiring seat belt use for front seats only, but not for rear seats, also the law is not applicable for all types of road in Morocco. (ITF, 2018). While in South-Africa, Kenia and Nigeria all occupants require to use a seat belt, but only since 2014 for Nigeria (WHO, 2018).

The latest prevalence of seat belt use within member countries of the International Traffic Safety Data and Analysis Group (IRTAD) is reported by the International Transport Forum (ITF) in the Road Safety Report 2018 (ITF, 2018).The figures show that in the different countries, the proportion of car occupants wearing a seat belt is higher in front seats than in rear seats. The average wearing rates for front seats ranges between 80% and 100% for most of the countries. However, some countries like Morocco, Italy and Greece have much lower rates ranging from 60% to 77% (ITF, 2018) and South-Africa has an extremely low rate measured in observational studies in 2010, with only approximately 5% of drivers

wearing their seat belt (ITF, 2017). However, this rate for South-Africa differs a lot from the self-reported seat belt wearing rate of 33% which was reported by the Road Traffic Management Corporation's (RTMC) traffic offence survey conducted in South-Africa in 2010 (WHO, 2018). Seat belt use for passengers in the back seats of a car is overall lower, but remains 95% or higher in Canada, Australia, Czech Republic, Norway and Germany (ITF, 2018). Slovenia has a rear-seat seat belt wearing rate of 69% and Hungary 52%, Japan has a rear-seat rate of only 36%, as does Korea with 30% rear-seat usage (ITF, 2018). However, large differences are found for Slovenia, Hungary, Japan and Korea between the reported back seat use and front seat use lowest rate for wearing a seat belt in the back seats of a car are found in Morocco and Greece with approximately 25%, Italy with approximately 11% and at the extreme end in Nigeria with only 1% (ITF, 2017; 2018).

It has to be taken into consideration that the above mentioned rates are based on national surveys and not on international comparison studies using the same methodology, thus making comparison between countries biased (ITF, 2017). Although there is no common global method to measure seat belt use, the national surveys do provide a good idea and understanding of the safety measures taken per country. In order to make accurate comparisons on a global level, several international surveys have been conducted over the years, comparing the seat belt use and attitudes towards not wearing a seat belt within a variety of countries.

For instance, the Bloomberg Philanthropies Global Road Safety Program has compared seat belt use in four countries; Egypt, Mexico, Russia and Turkey during the years 2010-2011. The study concluded that within these countries, average scores on seat belt use were below 60% with higher rates for drivers compared to front seat passengers (Hyder et al, 2012; Vecino-Ortiz et al. 2014). The attitudes towards seat belt use in seven European countries (Belgium, France, Germany, Italy, Romania, Spain, and the United Kingdom) were studied in the pan-European survey in 2015, revealing that more than 1/3 of the European habitants fail to use a seat belt as passengers in the rear seats of a car (The pan-European survey, 2015). Attitudes measured during a telephone survey in the United States revealed similar results showing lower seat belt rates for passenger in the back seats in comparison with front seat passengers. The reasons given were forgetfulness, discomfort and inconvenience (Jermakian & Weast, 2017). The belief that a seat belt in the back is less important is also found by Beck at al. (2019) in another study from the United States, especially among passengers that often use a taxi compared to driving in their own vehicle In the State of Qatar, attitudes towards seat belt use have been measured among professional taxi and public bus drivers; 93% of them consider it completely unacceptable to drive with passengers who do not wear their seat belts and 2% consider this risky driving behaviour to be completely acceptable (Timmermans et al., 2019).

The European Union Commission funded international projects measuring the Social Attitudes to Road Traffic Risk (SARTRE) in Europe, also measuring specific attitudes and beliefs towards seat belt use. The SARTRE3 project was reported in 2004 and revealed that people underestimate the safety effects of wearing a seat belt when driving carefully, an attitude observed among a lot of drivers who do not wear their seat belt within many European countries (SARTRE3, 2004). The follow-up project SARTRE4 in 2012 also assessed the attitudes towards legal regulations and increasing the severity for penalizing failure to wear a seat belt or use an appropriate CRS (SARTRE4, 2012).

However, despite the projects mentioned above, there is a lack of comparable data between European countries and countries on other continents. Therefore, this ESRA2 thematic report aims to reduce this gap in international comparison studies by providing data on the attitudes and belief of road users on wearing seat belts and the use of proper child restraint systems, from 32 countries of four global regions (20 European, 2 American, 5 African and 5 countries from the Asian and Oceanian region).

This study will answer several research questions:

1. What is the self-declared use of seat belts or appropriate CRS and how does this differ per country, gender and age group?
2. What is the acceptability of not using a seat belt or appropriate CRS, per country, gender and age group?

3. What are the attitudes towards CRS use and how does this differ per country, gender and age group?
4. What is the effect of age, gender, country of residence, education and driving frequency on the propensity to transport children securely using an appropriate CRS?
5. What is the effect of enforcement of seat belt use and attitudes towards CRS use on the propensity to transport children securely using an appropriate CRS?
6. What is the effect of age, gender, country of residence, education, driving frequency and crash history on the propensity to wear a seat belt as a driver?
7. What is the effect of enforcement of seat belt use and attitudes towards CRS use on the propensity to wear a seat belt as a driver?

Methodology

ESRA (E-Survey of Road users' Attitudes) is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The aim is to collect and analyse comparable data on road safety performance, in particular road safety culture and behaviour of road users. The ESRA data are used as a basis for a large set of road safety indicators. These provide scientific evidence for policy making at national and international levels.

ESRA data is collected through online panel surveys, using a representative sample of the national adult populations in each participating country (at least N = 1000 per country). At the heart of this survey is a jointly developed questionnaire, which is translated into national language versions. The themes covered include self-declared behaviour, attitudes and opinions on unsafe traffic behaviour, enforcement experiences and support for policy measures. The survey addresses different road safety topics (e.g. driving under the influence of alcohol, drugs and medicines, speeding, distraction) and targets car occupants, motorcycle and moped drivers, cyclists and pedestrians. The present report is based on the second edition of this global survey, which was conducted in 2018 (ESRA2_2018). In total this survey collected data from more than 35 000 road users across 32 countries.

The participating countries in ESRA2_2018 were:

- Europe: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom;
- America: Canada, USA;
- Asia and Oceania: Australia, India, Israel, Japan, Republic of Korea;
- Africa: Egypt, Kenya, Morocco, Nigeria, South Africa.

Vias institute in Brussels (Belgium) initiated and coordinates ESRA, in cooperation with eleven core group partners (BASt (Germany), BFU (Switzerland), CTL (Italy), IATSS (Japan), IFSTTAR (France), ITS (Poland), KFV (Austria), NTUA (Greece), PRP (Portugal), SWOV (the Netherlands), TIRF (Canada)). The common results of the ESRA2_2018 survey will be published in a Main Report, a Methodology Report and at least fifteen Thematic Reports (**Error! Reference source not found.**). Furthermore, 32 country f act sheets were produced, in which national key results are compared to a regional mean (benchmark) and scientific articles, national reports and many conference presentations are currently in progress. An overview of the results and news on the ESRA initiative is available on: www.esranet.eu

Table 1: ESRA2 Thematic Reports

Driving under influence	Child restraint systems	Cyclists
Speeding	Unsafety feeling & risk perception	Moped drivers & motorcyclists
Distraction (mobile phone use)	Enforcement	Young road users
Fatigue	Vehicle automation	Elderly road users
Seat belt	Pedestrians	Gender aspects

The present report summarizes the ESRA2_2018-results with respect to a combination of two traffic safety topics: seat belt use and the use of child restraint systems (CRS). An overview of the data collection method and the sample per country can be found in (Meesmann & Torfs, 2019. ESRA2 methodology).

This thematic report covers the following aspects:

(1) Acceptability of safe and unsafe traffic behaviour: the use of seat belt and CRS

Question: Where you live, how acceptable would most other people say it is for a CAR DRIVER to…?

- not wear a seat belt while driving
- transport children in the car without securing them (child's car seat, seat belt, etc.)

Question: How acceptable do you, personally, feel it is for a CAR DRIVER to …?

- not wear a seat belt while driving
- transport children in the car without securing them (child's car seat, seat belt, etc.)

In both questions, the respondents were asked to rate the acceptability levels using a 5-point (Likert) scale, ranging from 1 (= unacceptable) to 5 (= acceptable). The results from both questions are presented side by side in order to compare the personal acceptability of drivers with the social normative acceptability of most other people in the drivers' living environment.

(2) Self-declared safe and unsafe traffic behaviours

Question: Over the last 30 days, how often did you as a CAR DRIVER …?

- drive without wearing your seat belt
- transport children under 150cm without using child restraint systems (e.g. child safety seat, cushion)
- transport children over 150cm without wearing their seat belts

Question: Over the last 30 days, how often did you as a CAR PASSENGER …?

- travel without wearing your seat belt in the back seat

The respondents were asked to give an answer in a 5-point (Likert) scale, ranging from 1 (= never) to 5 (= almost always).

(3) Attitudes towards safe and unsafe traffic behaviours

Question: To what extent do you agree with each of the following statements?

- For short trips, it is not really necessary to use the appropriate child restraint.

The respondents were asked to give an answer on a 5-point (Likert) scale, ranging from 1 (= disagree) to 5 (= agree).

(4) Support road safety policy measures

Question: Do you oppose to or support a legal obligation to …?

- have a seat belt reminder system for the front and back seats in new cars

The respondents were asked to give an answer on a 5-point (Likert) scale, ranging from 1 (= oppose) to 5 (= support).

(5) Reported police checks and perceived likelihood of getting caught for traffic offences

Question: On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for…

- … wearing your seat belt

The respondents were asked to give an answer on a 7-point (Likert) scale, ranging from 1 (= very unlikely) to 7 (= very unlikely).

The results are presented in two parts. The first part comprises descriptive analyses. In order to assess if the answers were significantly different between gender groups or age groups statistical Chi-square tests were applied.

Note that a weighting of the data was applied to the descriptive analyses. This weighting took into account small corrections with respect to national representativeness of the sample, based on gender and six age groups: 18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+. This weighting was based on population statistics from United Nations data (United Nations Statistics Division, 2019). For the regions, the weighting also took into account the population size of each country in the total set of countries from this region. SPSS 22.0 (2013) was used for all analyses.

The second part consists of further analyses. In particular, in order to investigate the association of self-declared behaviour related to CRS use for children under 150cm height and seat belt use as a driver with various predictors at an individual level, we developed four logistic regression models. Persons who never drive a car were not included in these analyses. In the first two logistic regression models, the following explanatory variables were considered: socio-demographic variables (gender, age group and level of education), driving frequency, crash history, acceptability for transporting children without securing them, attitudes towards CRS use on short trips, support for road safety measures aimed to improve seat belt use, and perceived likelihood of being checked by the police for wearing a seat belt. The respondents' country of residence was included in the third and fourth logistic regression model, in order to explore differences and similarities between the countries while controlling for other factors.

Results

1.1 Descriptive results

This section presents the results of the analyses on acceptability, self-declared behaviour, attitudes towards unsafe behaviours and enforcement related to seat belt and CRS use. The emphasis of the statistical analysis is on the comparison between gender, age and countries.

1.1.1 Self-declared safe and unsafe behaviour in traffic

The national results in self-declared driving without a seat belt and the use of a CRS to transport children are displayed in Figure 1 and Figure 2 respectively. The self-declared unsafe behaviour of driving without the use of a seat belt as a driver and travelling without a seat belt as a passenger in the back seat of a car reveal much more differences between countries, when compared to the unsafe behaviour of transporting children without an appropriate CRS.

The results in Figure 1 show that Austria has the lowest percentages both for travelling without a seat belt as a driver and without a seat belt as a passenger in the back seat (only 3.7 percentage points difference in occurrence between both questions), while Japan also has a low percentage for not using a seat belt as a driver, but a much higher one for not using a seat belt as a passenger in the back seat of a car (55 percentage points difference between front and rear seat). Overall, the percentage of not wearing a seat belt as a passenger in the back seat is higher than the percentage of not using a seat belt as a driver for all countries. This difference between the seat belt use in a front and a rear seat might be explained by the idea that the rear seats of a car are a safer position for passengers than the front seats, which decreases the importance of using the seat belt in the rear seats (Beck et al., 2019).

In particular, the Czech Republic, Greece, Hungary, Italy, Poland, Serbia and Switzerland have higher percentages than the Europe means for not wearing a seat belt as a driver (17.2%) and for not wearing one as a passenger in the back seat (36.6%). This last European mean is in line with the previous pan-European survey (2015) which indicated that more than 33% of the European car passengers reported not using a seat belt in the rear seats. The United States have higher percentages than the North America means set on 18.2% for driving without a seat belt as a driver and set on 31.8% for travelling without a seat belt as a passenger in a back seat. These results are in line with a study by Beck at al. (2019), which reported an overall higher usage of a seat belt by passengers situated in the front seats (86%) in comparison to passengers situated in the back seats of a car (62%). India has higher percentages than the Asia/Oceania mean; for instance the Asia/Oceania mean is set on 34.6% for seat belt use as a driver and set on 68.3% for seat belt use as a passenger. Finally, Egypt, Kenya and Nigeria have higher percentages than the Afria5 mean set on 43.9% for not using a seat belt as a driver and set on 66.3% for not using a seat belt in the back seat as a passenger.

Figure 2 shows the self-declared occurrence of transporting children under 150cm of height without using a CRS, and children over 150cm without using a seat belt. The North America means show the lowest occurrence for both questions around 10%, followed by the Europe means around 15% for both questions. In specific, the North America mean for children under 150cm is 10.5% and 10.1% concerning children over 150 cm, and the Europe means are respectively 15.0% and 13.0% for both lenghts[1]. Despite the North America means showing the lowest percentages, the European countries Austria and Slovenia declare the lowest percentage for transporting a child under 150cm without CRS and above 150cm without seat belt, both below 9%. The United States is declaring an occurrence below the North America means, with 9.5% transporting children under 150cm without appropriate CRS and 9.3% for children over 150cm without seat belt. On the contrary, the Africa means show the highest occurrence of self-declared transportation of children without using CRS, with 46.8% for children under 150cm, and 48.4% without wearing a seat belt for children over 150 cm. The Asia/Oceania means show also high occurrence of failure to use an appropriate CRS (children under 150cm) and failure to wear a seat belt (children over 150cm), with respectively 43.7% and 46.6% for both lengths[1].

[1] *The limit of 150 cm was adapted to 135 cm or age in some countries according to their legislation on CRS.*

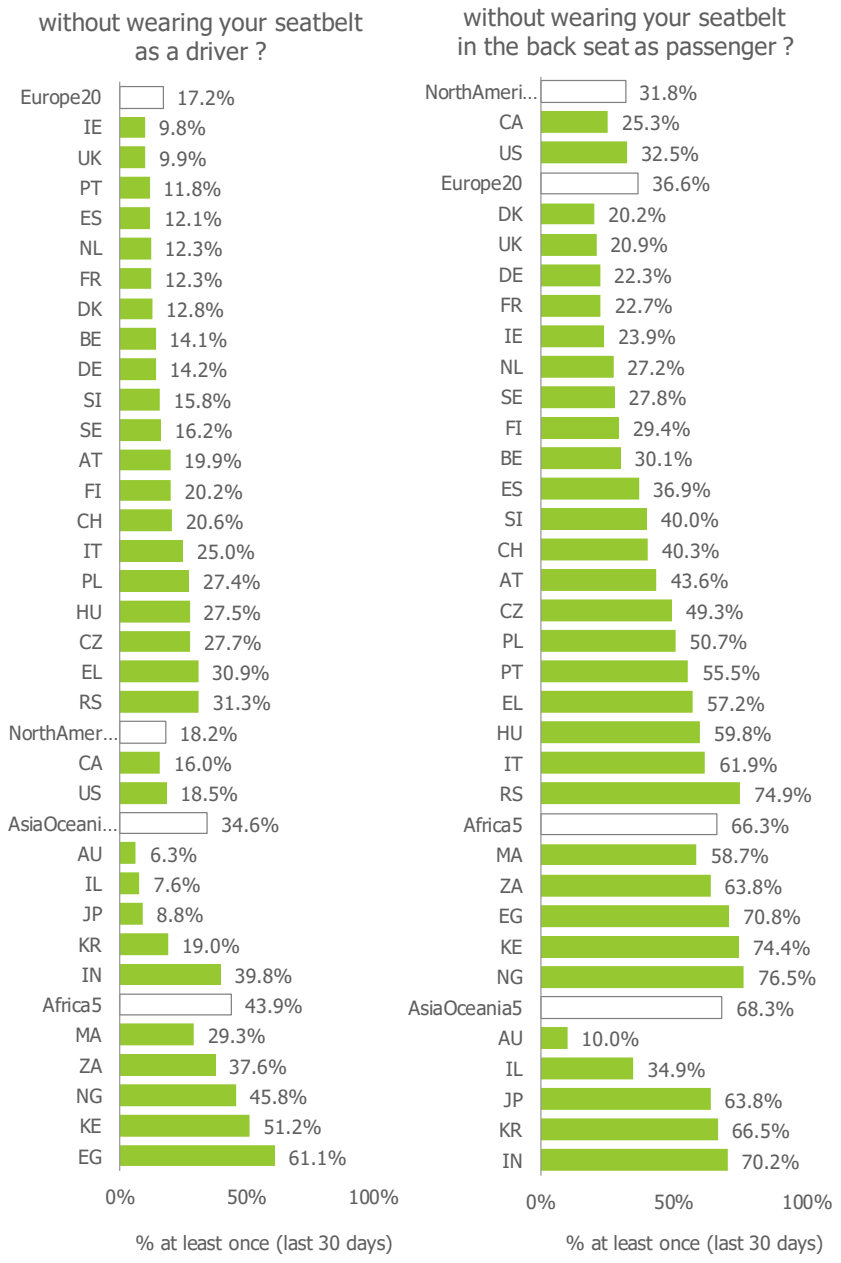

Figure 1: Self-declared percentage of driving at least once during the last 30 days 'without wearing a seat belt as driver' and 'without seat belt as passenger in the rear seat', by country.

Notes: (1) % at least once: scores 2 to5 on a 5-point scale from 1 'never' to 5 '(almost) always'. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

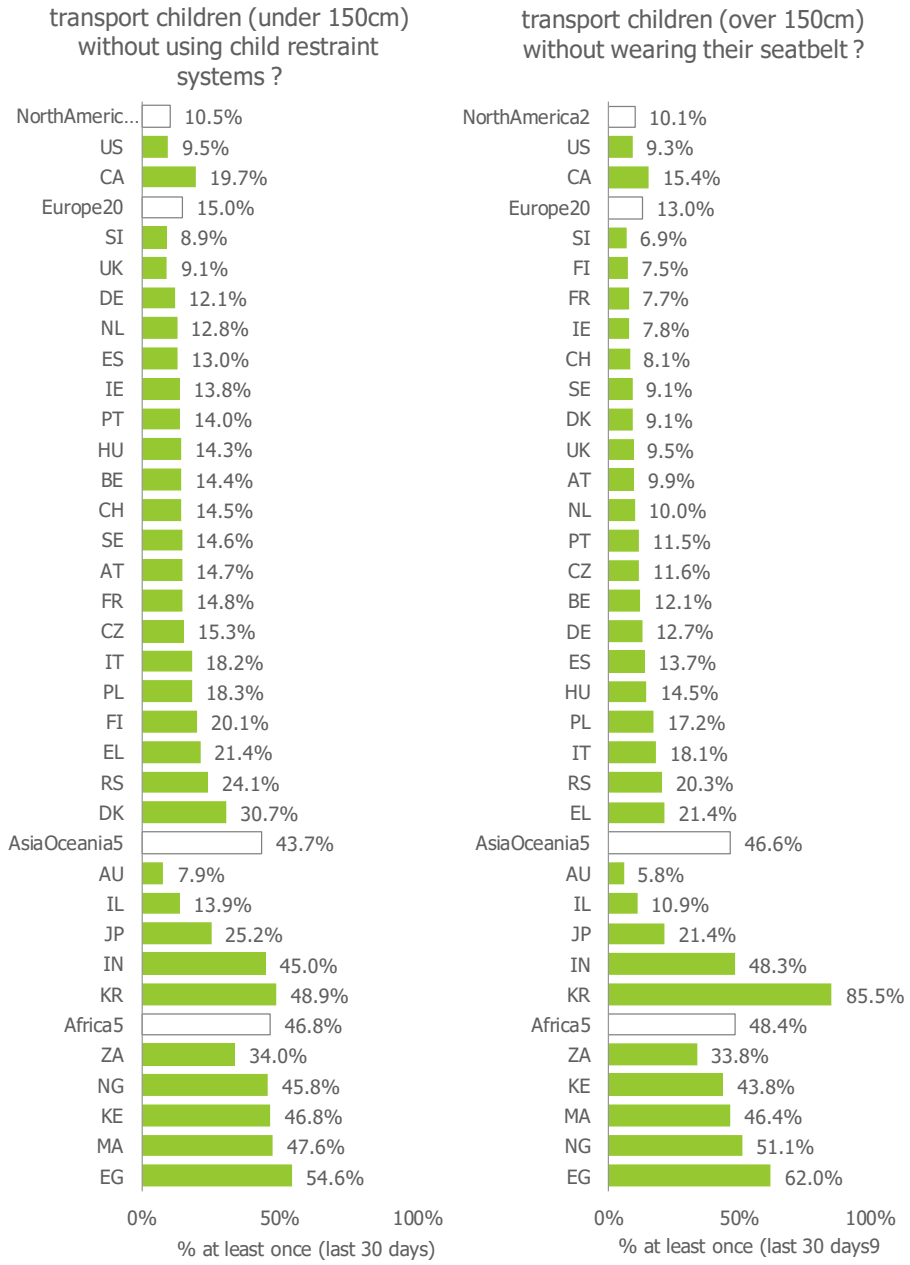

Figure 2: Self-declared percentage of transporting at least once during the last 30 days 'children under 150cm length without using appropriate CRS' and 'children over 150cm length without wearing their seat belt', by country.

Notes: (1) % at least once: scores 2 to5 on a 5-point scale from 1 'never' to 5 '(almost) always'. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

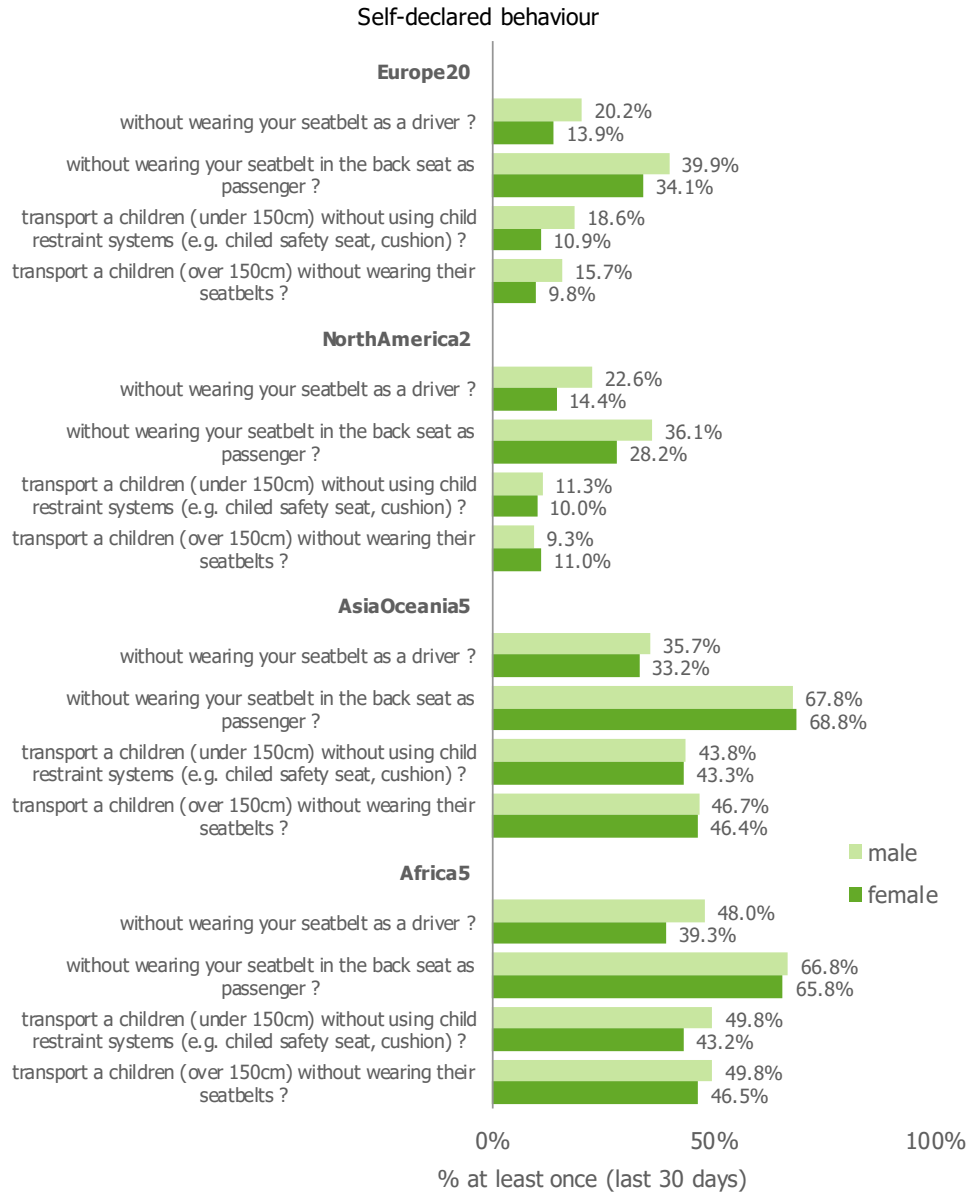

Figure 3: Self-declared percentage of unsafe traffic behaviours as a road user at least once during the last 30 days, related to seat belt and CRS use, by gender.

Notes: (1) % at least once: scores 2 to5 on a 5-point scale from 1 'never' to 5 '(almost) always'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

Figure 3 reveals the self-declared unsafe behaviours related to seat belt and CRS use in the last 30 days, per region comparing male and female respondents. Results show that for all four regions, both male and female respondents self-declare a clearly higher occurrence of not wearing a seat belt as a passenger in the back seat of a car, in comparison to not wearing a seat belt as a car driver.

Overall worldwide, female respondents are significantly more likely to transport children properly secured with CRS if smaller than 150 cm (X^2 (1, N = 35036) = 87.85, p <0.001) and with a seat belt if taller than 150cm (X^2 (1, N = 35036) = 73.60, p <0.001), in comparison to male respondents. Besides, in comparison to males, the female participants are significantly more likely to report to use a seat belt as a driver (X^2 (1, N = 35036) = 214.50, p <0.001) and to report to wear a seat belt as a back seat passenger (X^2 (1, N = 35036) = 58.90, p <0.001). The differences between males and females range

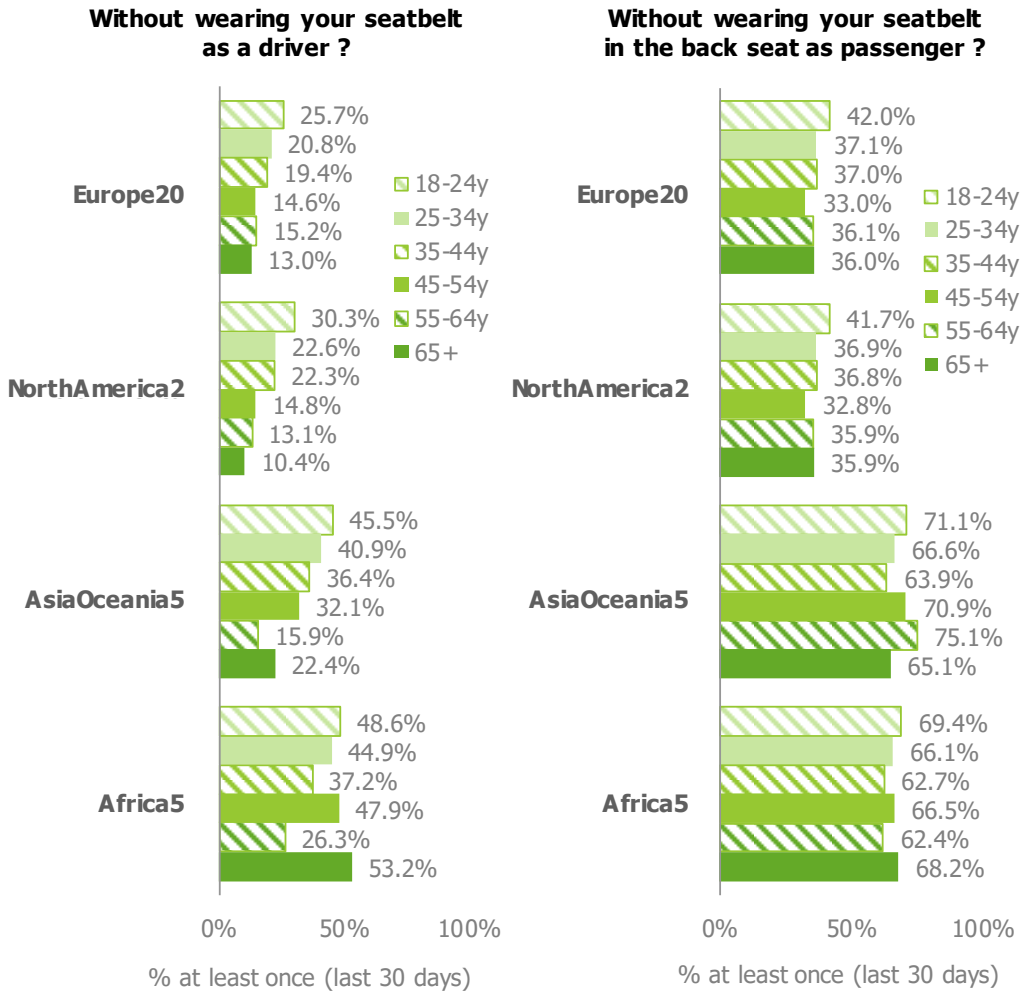

Figure 4: Self-declared percentage of driving at least once during the last 30 days 'without wearing a seat belt as driver' and 'without seat belt as passenger in the rear seat', by age (cohorts).

Notes: (1) % at least once: scores 2 to5 on a 5-point scale from 1 'never' to 5 '(almost) always'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

from 5.8% for wearing the seat belt in a back seat to 6.3% for wearing it as a driver in the European region, from 7.9% for wearing the seat belt in a back seat to 8.2% for wearing it as a driver in the North America region, from 1.0% for wearing the seat belt in a back seat to 2.5% for wearing it as a driver in Asian and Oceanian region, and from 1.0% for wearing the seat belt in a back seat to 6.6% for wearing it as a driver in the African region. These results are in line with previous research conducted by Soliman et al. (2018) who found a higher seat belt use and more safe driving habits among females in comparison to males in the Arabic culture.

Based on the results presented in Figure 3 for all four traffic behaviours, it is interesting to note that the self-declared percentages of occurrence are much higher than it would be expected based on the overall low personal acceptability for not using a seat belt or a CRS (Figure 8).

The percentages of at least once without wearing a seat belt as a driver or as a passenger in a back seat and at least once without transporting a child properly secured are portrayed per age category in Figure 4 and Figure 5 respectively. Results show significant age differences for self-declared use of seat belt as a driver (X^2 (5, N = 35036) = 491.48, p <0.001), self-declared use of seat belt as a backseat passenger (X^2 (5, N = 35036) = 249.99, p <0.001), self-declared use of CRS for children below 150cm

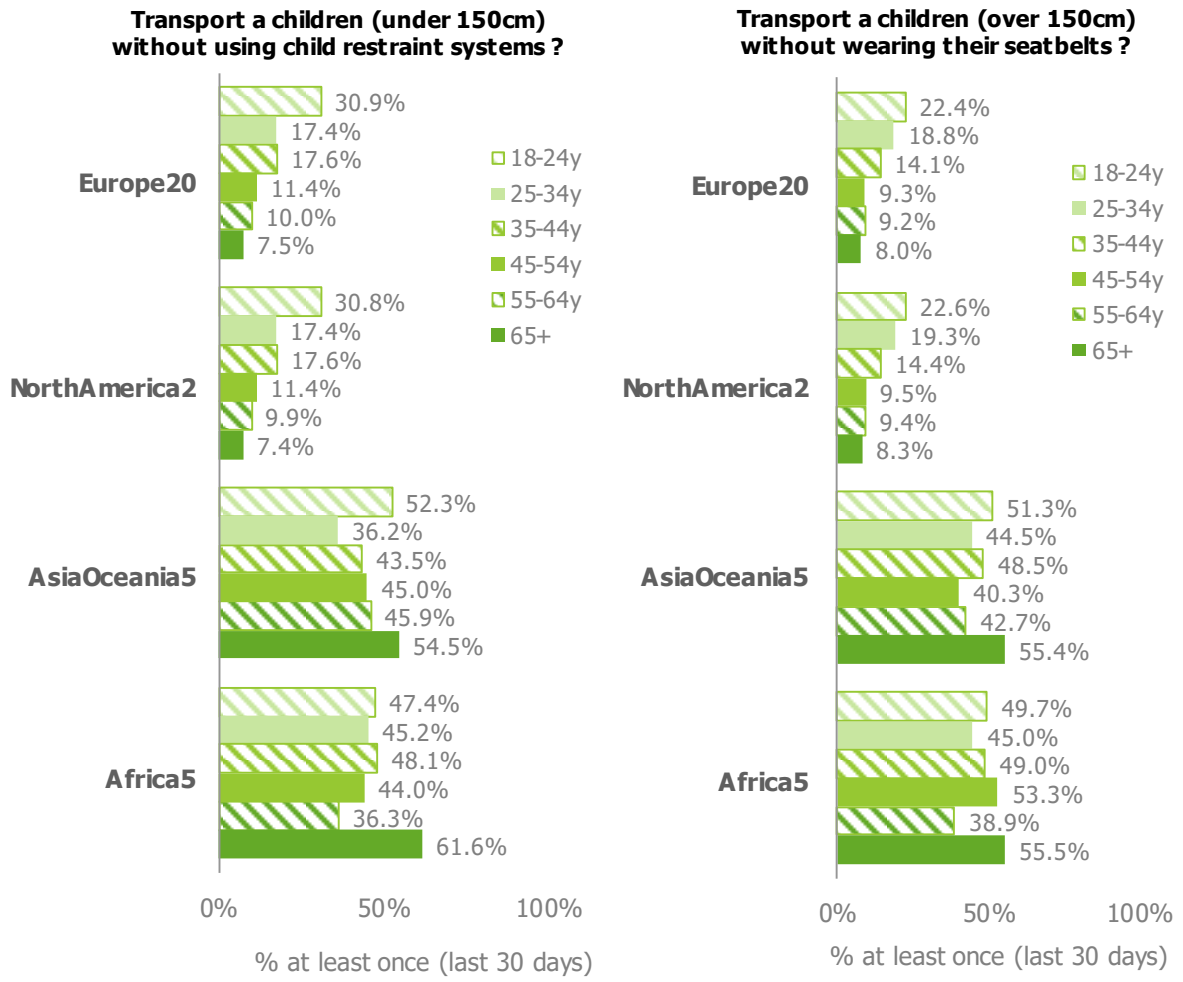

Figure 5: Self-declared percentage of transporting at least once during the last 30 days 'children under 150cm length without using appropriate CRS' and 'children over 150cm length without wearing their seat belt', by age (cohorts).

Notes: (1) % at least once: scores 2 to5 on a 5-point scale from 1 'never' to 5 '(almost) always'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

(X^2 (5, N = 35036) = 311.20, p <0.001) and self-declared use of seat belt for children above 150cm of height (X^2 (5, N = 35036) = 258.54, p <0.001). Results in both Figure 4 and Figure 5 show that within the European and the North American region the youngest respondents (18-24y) self-declare the highest percentages for three questions related to not using a seat belt as a driver or an appropriate CRS, while the oldest respondents (65+) self-declare the lowest percentage of these unsafe traffic behaviours. These results are in line with Shults et al. (2016) who found a very low seat belt use for teenage drivers in the United States.

However, no clear age differences were visible for the self-declared behaviour of not wearing a seat belt as a passenger in the back seat of a car within all four regions. All age cohorts in the Asian and Oceanian region and the African region have higher percentages than those in the European and the North American region for not using a seat belt as a driver, as well as not using a seat belt or CRS for passengers in the back seats of a car. In contrast to the European and North American region, the older respondents in the Asian and Oceanian region and the African region do not self-declare a lower occurrence for the unsafe behaviours described in Figure 4 and 5 when compared to the younger respondents in these regions.

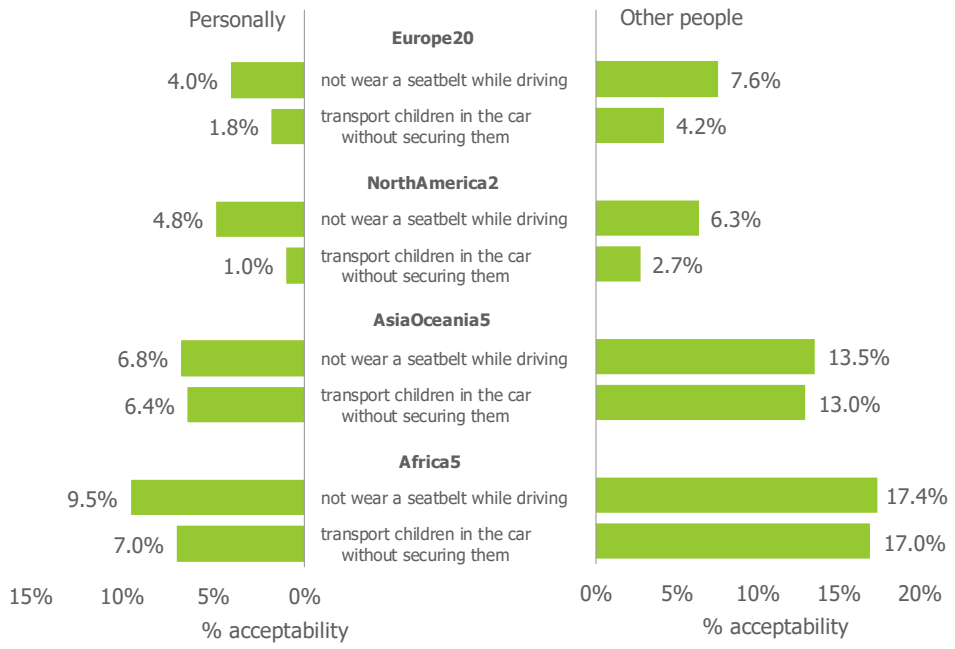

Figure 6: Personal acceptance and perceived social normative acceptance of 'not wearing a seat belt while driving' and 'transporting a child without CRS', by region.

Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight.

1.1.2 Acceptability of safe and unsafe traffic behaviour

Respondents were asked to report their personal acceptance and their perception of social normative acceptability for unsafe behaviours related to seat belt and CRS use, as visible in Figure 6

In the European region, an average of 4.0% of the respondents consider that it is acceptable not to wear a seat belt while driving, despite the legal obligation in Europe to wear a seat belt on any seat inside the car. Personal acceptance for transporting children without securing them, has a much lower level of acceptability with a mean of 1.8% among respondents in Europe. In the North American region, 4.8% of the respondents personally consider that it is acceptable not to wear a seat belt while driving. In North America, personal acceptance for transporting children without securing them has the lowest level of acceptability of all regions with a mean of 1.0%. In the Asian and Oceanian region, personal acceptance of not wearing a seat belt while driving has a mean of 6.8%, while 6.4% of the respondents consider that it is acceptable to transport children without securing them. Finally, in the African region, the highest level of acceptance for not wearing a seat belt while driving is found among 9.5% of the respondents. Personal acceptability for transporting children without securing them is also very high in African countries with a mean of 7.0%.

Most of the respondents seem to believe that other people find it more acceptable not to wear a seat belt while driving or to transport children without restraint in relation to themselves. The results in Figure 6 show almost double the level of social normative acceptability versus the level of personal acceptability across all four regions. These results indicate that respondents declare that the social norm, among other people in the same region, is more likely to perceive those behaviours as acceptable.

Figure 7 displays the acceptability of not using a seat belt or CRS for each country as well as the regional mean, ordered from lowest to highest percentage of personal acceptability. The results show high country variability in acceptability percentage per region. For instance, within the European region, the personal acceptability for not wearing a seat belt while driving ranges from 1.3% in Ireland to 8.4% in Poland.

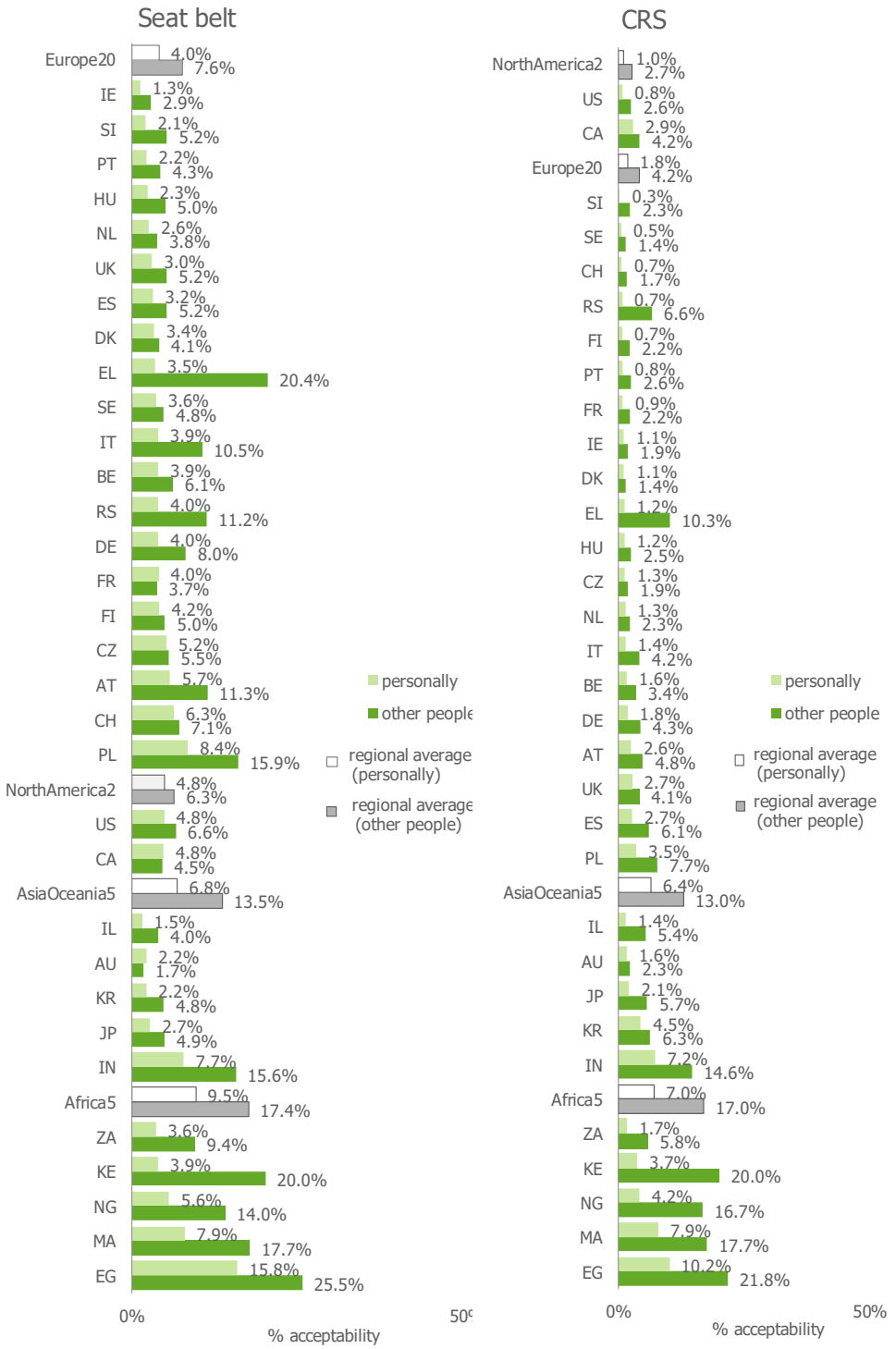

Figure 7: Personal acceptance and perceived social normative acceptance of 'not wearing a seat belt while driving' and 'transporting a child without CRS', by country.

Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

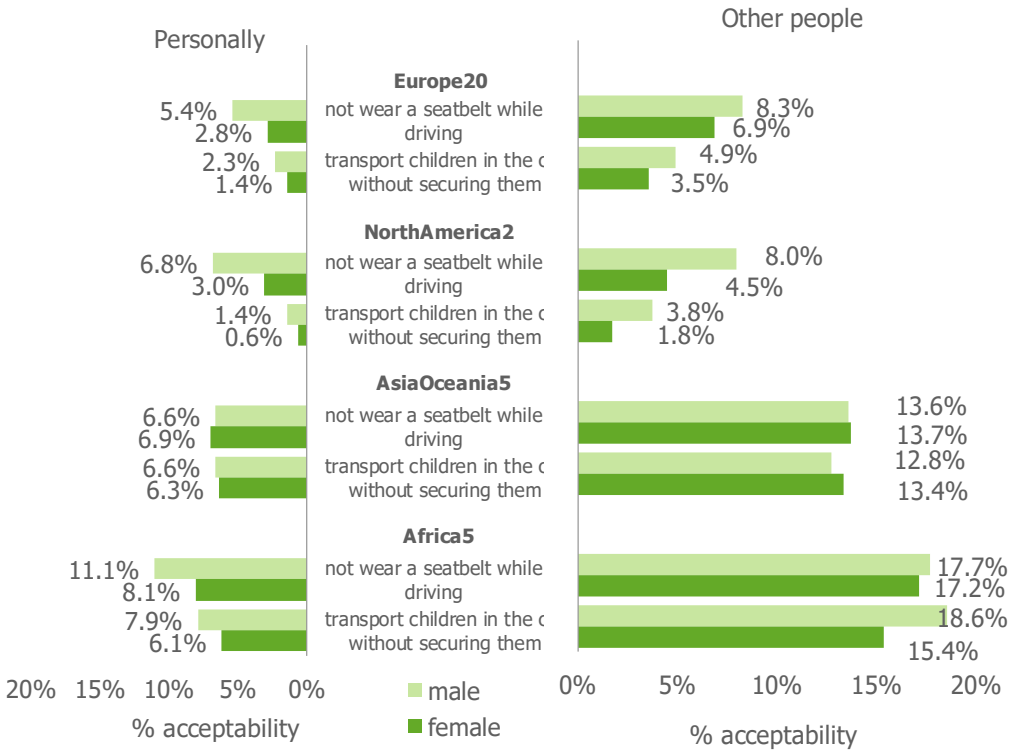

Figure 8: Personal acceptance and perceived social normative acceptance of 'not wearing a seat belt while driving' and 'transporting a child without CRS', by gender.

Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

Moreover, Austria and Poland have higher percentages than the European mean both on personal and social normative acceptance for not wearing a seat belt or using a CRS. Within the North American region, the United States have higher percentages than the North America mean on the personal acceptability for not wearing a seat belt, but has lower percentages than the North America mean on the acceptability of not using a CRS. In the Asian and Oceanian region, India has higher percentages than the Asia/Oceania mean both on personal and social normative acceptance of driving without wearing a seat belt or using a CRS. In the African region, Egypt has higher percentages than the Africa mean on the acceptability of not using a seat belt and both Egypt and Morocco have higher percentages than the Africa mean for the acceptability of transporting children without securing them. Both for personal and social normative acceptability of not wearing a seat belt, the Europe mean reveals the lowest percentages of acceptance, while the lowest percentages of acceptance for not using a CRS is found for the NothAmerica2 mean. The Africa mean shows the highest percentages of acceptability for not applying either safety measure.

In almost all countries, the perceived social norm accepting not to use a seat belt while driving is higher than the personal acceptance. The differences are particularly high in Greece, Egypt, Kenya and Nigeria. On the other side, France and Canada show a slightly higher personal acceptance for not wearing a seat belt compared to the social norm.

Personal and perceived social normative acceptance of not using a seat belt and a CRS vary according to the gender and the age of the respondents. Figure 8 reveals the gender differences in acceptability for not wearing a seat belt as well as not using a CRS. Significant differences have been found between gender for personal acceptability of seat belt use as driver (X^2 (1, N = 35036) = 130.51, p <0.001), acceptability of other people for seat belt use as driver (X^2 (1, N = 35036) = 26.25, p <0.001), personal

acceptability of appropriate CRS use (X^2 (1, N = 35036) = 52.74, p <0.001) and acceptability of other people for appropriate use of CRS (X^2 (1, N = 35036) = 35.98, p <0.001). Results show that only in the Asian and Oceanian region, no differences are visible between male and female respondents; however, in all other regions males generally declare that it is more acceptable not to use a seat belt or CRS in comparison to females. Both self-declared personal acceptability and perceived social normative acceptability are higher among the male respondents in all regions except in the Asian and Oceanian region. The highest percentages of personal and social acceptability for driving without a seat belt or without CRS are found for males in the African region, followed by males in the Asian and Oceanian region and the North American region, while European males report the lowest level of acceptance for not applying both safety measures.

The differences among six age cohorts for declared acceptability of not wearing a seat belt or not using a CRS, are portrayed in Figure 9 and Figure 10 respectively. Significant differences have been found between the age groups for personal acceptability of seat belt use as a driver (X^2 (5, N = 35036) = 251.49, p <0.001), acceptability of other people for seat belt use as a driver (X^2 (5, N = 35036) = 389.64, p <0.001), personal acceptability of appropriate CRS use (X^2 (5, N = 35036) = 241.99, p <0.001) and acceptability of other people for an appropriate use of CRS (X^2 (5, N = 35036) = 387.30, p <0.001). As Figure 9 shows, younger respondents report higher levels of personal acceptance for not wearing a seat belt in all regions except the African region.. In the African region, the oldest respondents declare the highest level of personal acceptability for driving without the use of a seat belt. However, it is important to note that in Africa, the sample in this age category is very small and therefore the results

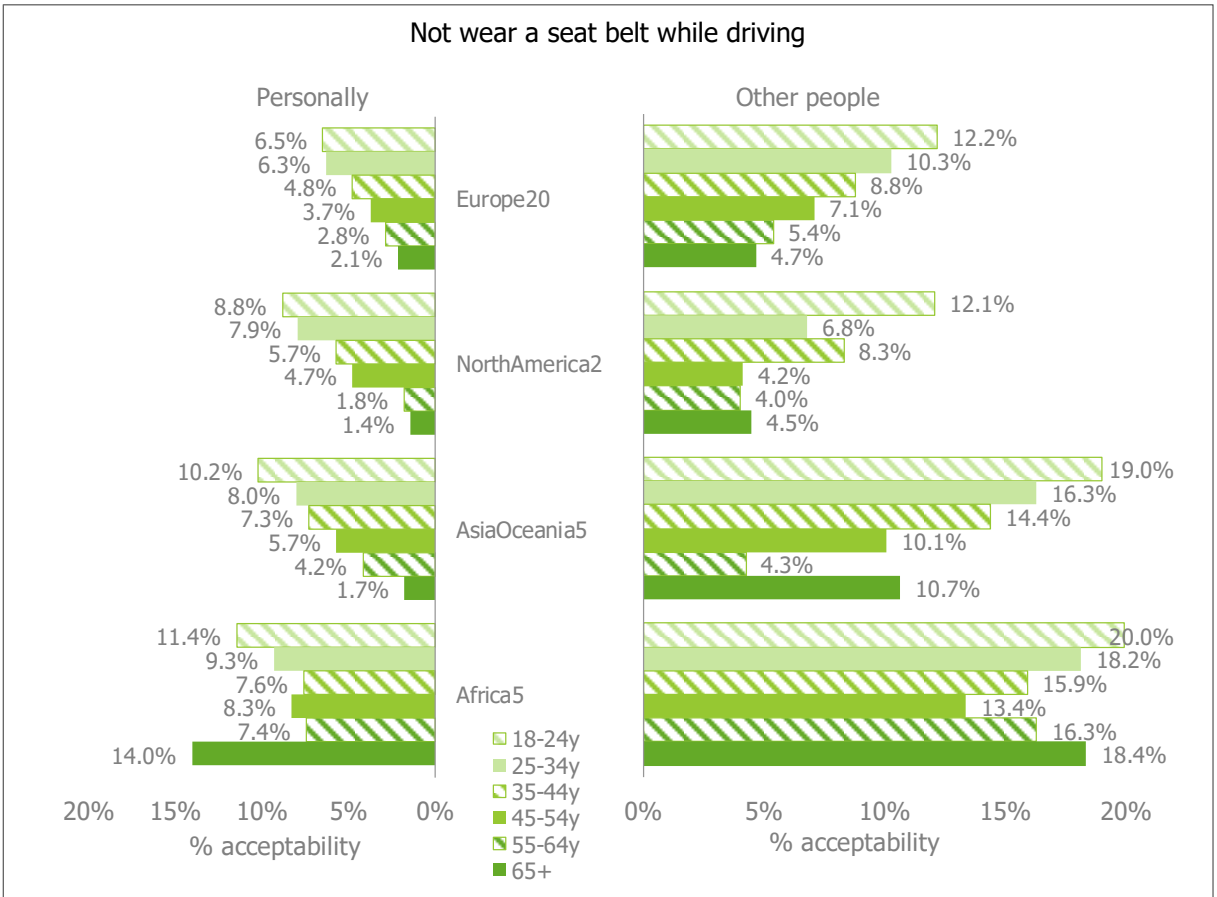

Figure 9: Personal acceptance and perceived social normative acceptance of 'not wearing a seat belt while driving', by age (cohorts).

Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

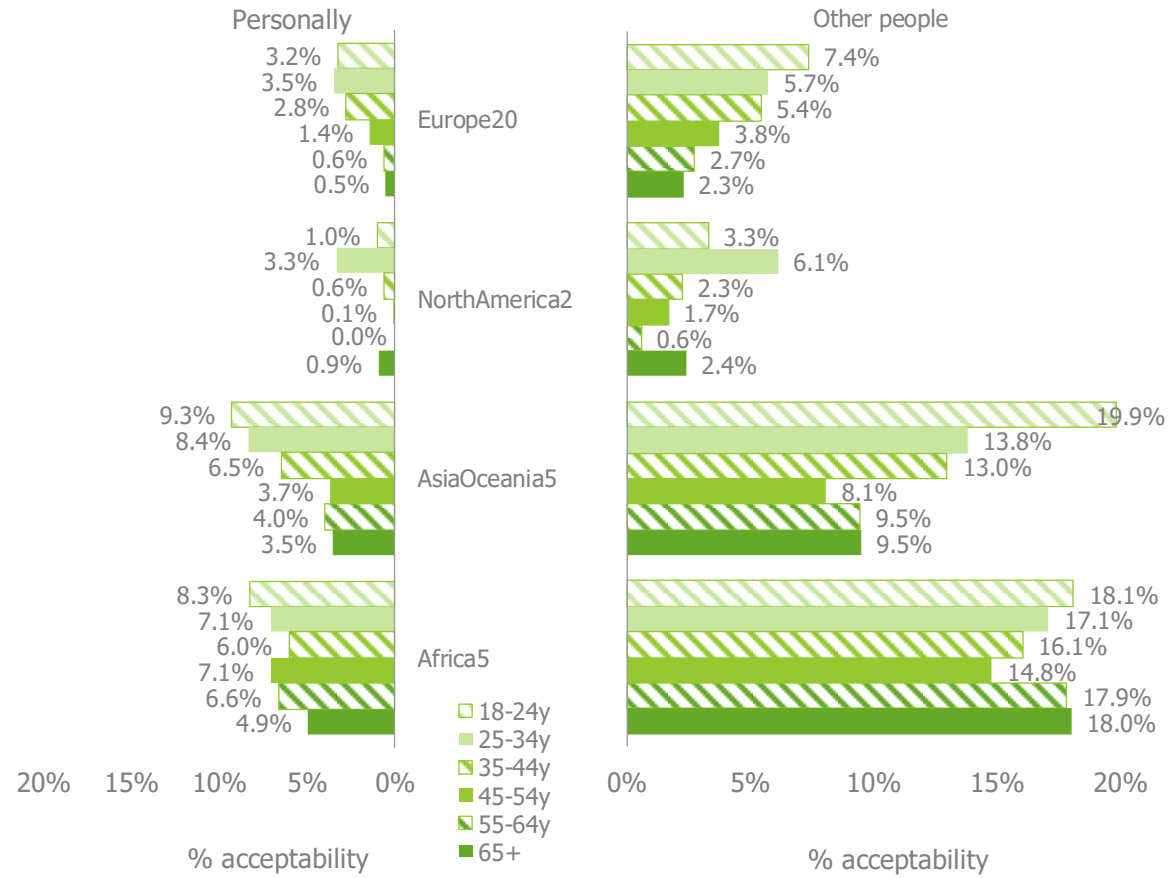

Figure 10: Personal acceptance and perceived social normative acceptance of 'transporting a child without CRS', by age (cohorts).

Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

should be interpreted with caution. Furthermore, the internet penetration in these countries is very low, which might also have affected the representability of the online sample for these countries.

As visible in Figure 10, revealing the personal acceptability of not using a CRS, a similar trend is found within the European and Asian and Oceanian region with the younger respondents declaring a much higher percentage of acceptability in comparison to the older respondents. Less variability for acceptability of CRS use is visible in the African region, especially among the middle age groups from 25 to 64 years, while the youngest African respondents (below 25 years of age) report the highest proportion of acceptability and the oldest respondents uphold the lowest. The acceptability of not using a CRS is lower in the North American region. The highest percentage of acceptability is declared by respondents between the age of 25 and 34 with an acceptance for driving without CRS three times higher than that of the younger respondents (below 25 years of age).

The same trends as described above for the personal acceptability of not using a seat belt or CRS is visible in both Figure 9 and Figure 10 for perceived social normative acceptability, with higher overall percentages of acceptance.

It is interesting to note that in the regions/countries where there is a higher level of acceptance for the social norm accepting not using a seat belt or a CRS, there is also a higher level of personal acceptance of such behaviours. The social norm accepting these unsafe traffic behaviours in a specific region could

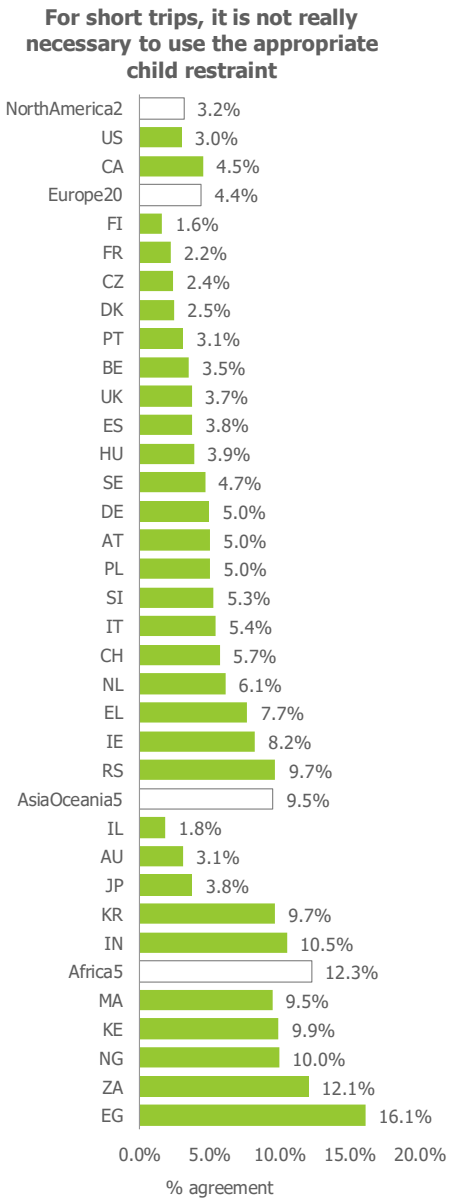

Figure 11: Self-declared percentage of agreement with the statement "For short trips, it is not really necessary to use the appropriate child restraint", by country.

Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

explain the higher personal acceptance among respondents in the same region. This is in accordance with the social normative theory, stating that if the social norm accepts certain unsafe driving behaviours, these observed behaviours committed by other people increase the personal acceptance of individuals by rationalizing these behaviours as normal and common (Ward et al., 2010).

1.1.3 Attitudes towards safe and unsafe behaviour in traffic

Figure 11 shows the percentage of agreement for the statement 'for short trips, it is not really necessary to use the appropriate child restraint' per country. Results show that the level of agreement differs from

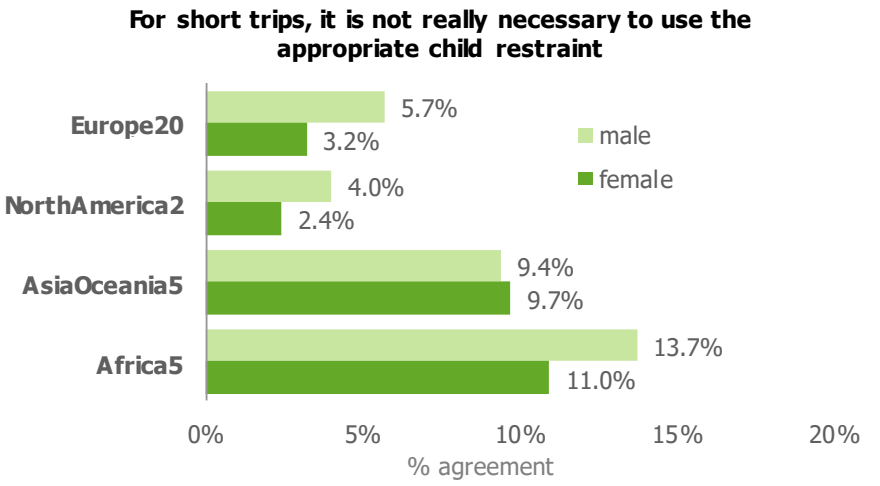

Figure 12: Self-declared percentage of agreement with the statement "For short trips, it is not really necessary to use the appropriate child restraint", by gender.

Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

one country to another, ranging from 1.6% to 16.1%, with respondents from most African countries showing more than 9% agreement.

The percentage of agreement on the statement that for short trips it is not necessary to use the appropriate child restraint, is shown by gender in Figure 12 and by age in Figure 13. Results show that the extent of agreement depends both on gender and age.

As visible in Figure 12, on average males are significantly more likely to agree with the statement than females in Europe, North America and Africa, while females are showing a slightly higher percentage of agreement than males for the Asia/Oceania mean (X^2 (1, N = 35036) = 91.46, p <0.001). In particular, more than 9.3% of both males and females within the Asian and Oceanian region and the African region agree that there is no need to use a CRS on short trips, while less than 5.7% of both male and female respondents within the European and North American region agree.

As shown in Figure 13, significant differences are found among different age categories (X^2 (5, N = 35036) = 187.27, p <0.001). Within the European, North American and Asian and Oceanian regions, higher agreement is reported among the younger respondents (18-34 years of age) for the statement "For short trips, it is not really necessary to use an appropriate child restraint". North America and Europe are showing the lowest percentage of agreement for this statement. In contrast, the Africa mean reveals the highest percentage of agreement, with both the youngest below 25 years of age and the oldest above 65 years of age showing the highest acceptance compared to the middle age cohorts.

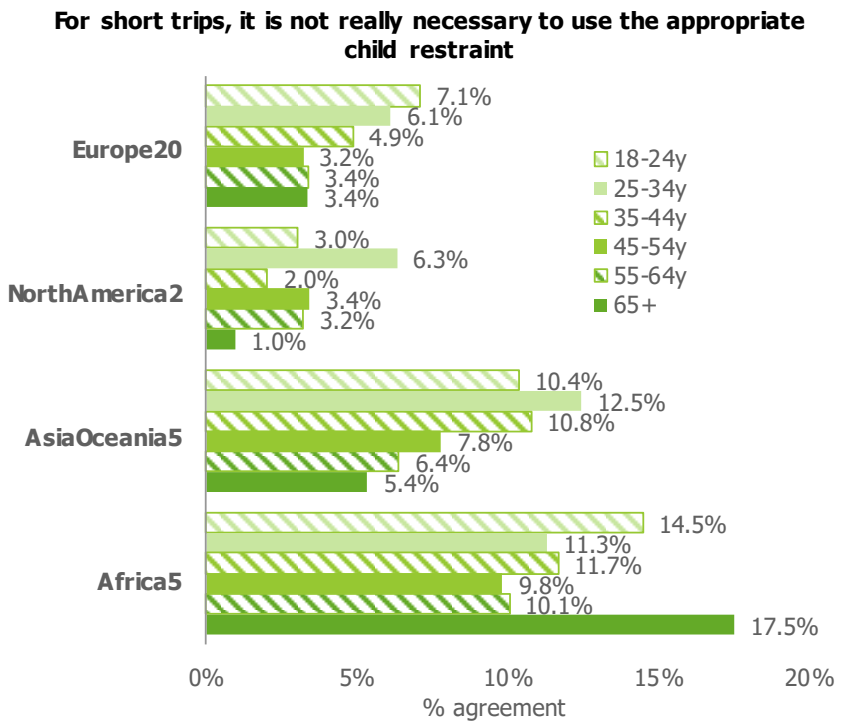

Figure 13: Self-declared percentage of agreement with the statement "For short trips, it is not really necessary to use the appropriate child restraint", by age (cohorts).

Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

1.1.4 Support policy measures

Figure 14 reveals the percentage of support, per participating country, for a legal obligation to have a seat belt reminder system for the front and back seats in new cars. Results show in general that respondents in all 32 participating countries agree that the traffic policy with respect to seat belt use could be more severe, with more than 65% support for the strict legal obligation. It is interesting to note that more than 80% of respondents within the African and the Asian and Oceanian region support a stricter safety policy related to seat belt use, although these same respondents declare the highest acceptance and self-declared behavioural occurrence of unsafe driving without a seat belt.

The percentage of support for a legal obligation to have a seat belt reminder system for the front and back seats in new cars is visualized in Figure 15 by gender and in Figure 16 by age.

Results in Figure 15 show that in all regions, over 70% of the respondents believe that an improvement on seat belt enforcement is still required. Females show significantly more support for a stricter legal obligation in comparison to males for all regions (X^2 (1, N = 35036) = 87.41, p <0.001), with the highest support (85.4%) in the Asian and Oceanian region, followed by the African region (83.8%), and the European region (80.5%) while the least support is declared by females in the North American region (77.4%). The gender variability in the support for the safety policy measure is the highest in the North American region with a 6.4 percentage points difference between male and female respondents, but the lowest in both the African and the Asia and Oceanian region with only a 1.2 percentage points difference between males and females.

Figure 16 indicates that there are also only slight differences between the four regions for all ages (X^2 (5, N = 35036) = 157.58, p <0.001). For instance, results based on the means of Europe, North America and Asia and Oceania show the younger respondents declaring less support for a law enforcement for seat belt use in comparison to the oldest respondents. The difference between the youngest age cohort (18-24y) and the oldest age cohort (65+) is 13.6 percentage points within the European region, but

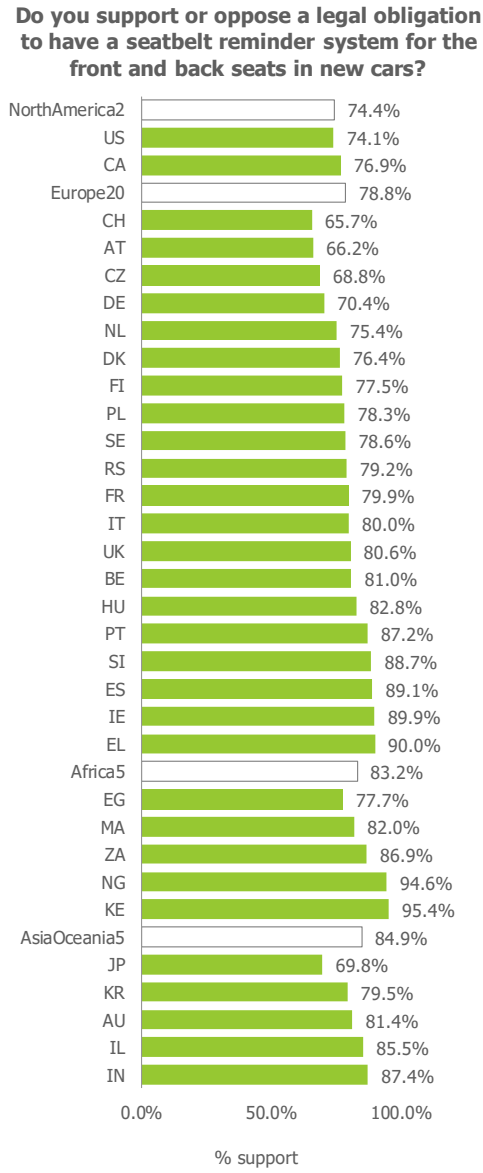

Figure 14: Self-declared percentage of support for the legal obligation to have a seat belt reminder system for the front and back seats in new cars, by country.

Notes: (1) % support: scores 4 and 5 on a 5-point scale from 1 'oppose' to 5 'support. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

only slight differences are visible between ages within the North American region and the Asian and Oceanian region.

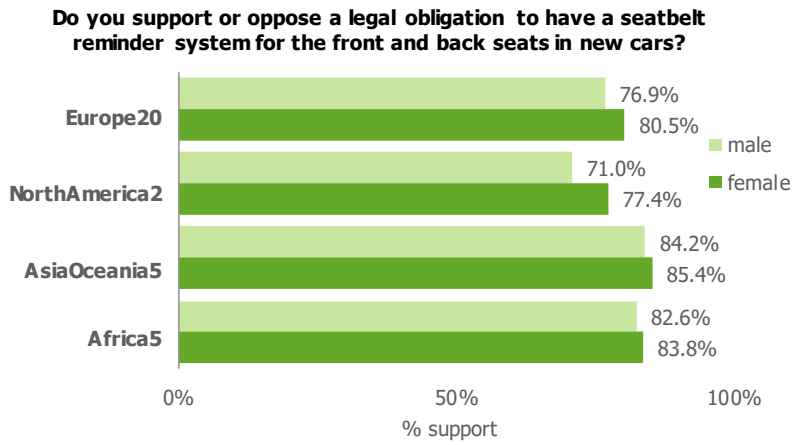

Figure 15: Self-declared percentage of support for the legal obligation to have a seat belt reminder system for the front and back seats in new cars, by gender.

Notes: (1) % support: scores 4 and 5 on a 5-point scale from 1 'oppose' to 5 'support. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

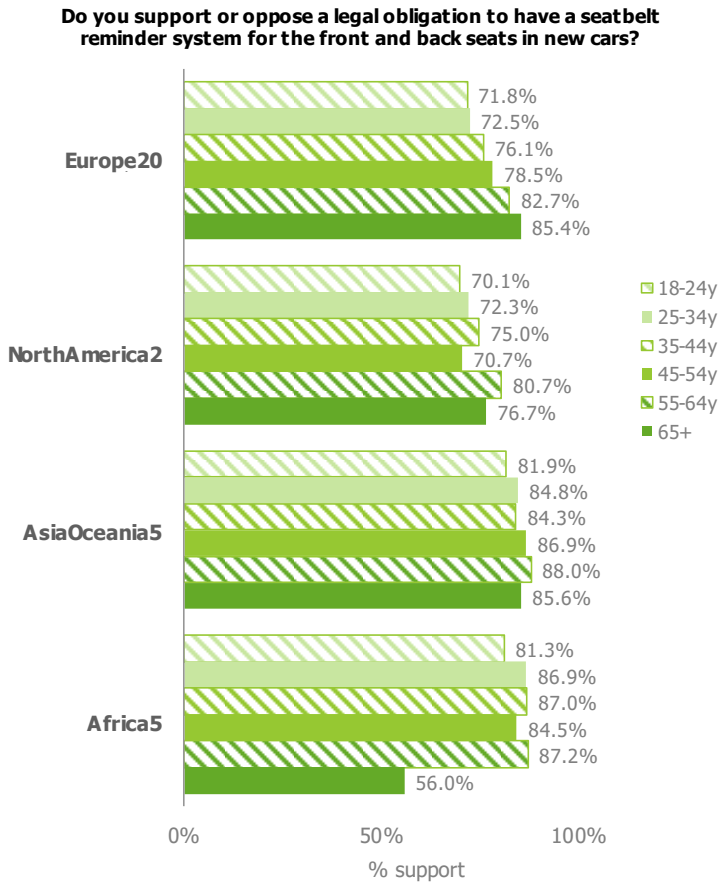

Figure 16: Self-declared percentage of support for the legal obligation to have a seat belt reminder system for the front and back seats in new cars, by age (cohort).

Notes: (1) % support: scores 4 and 5 on a 5-point scale from 1 'oppose' to 5 'support. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

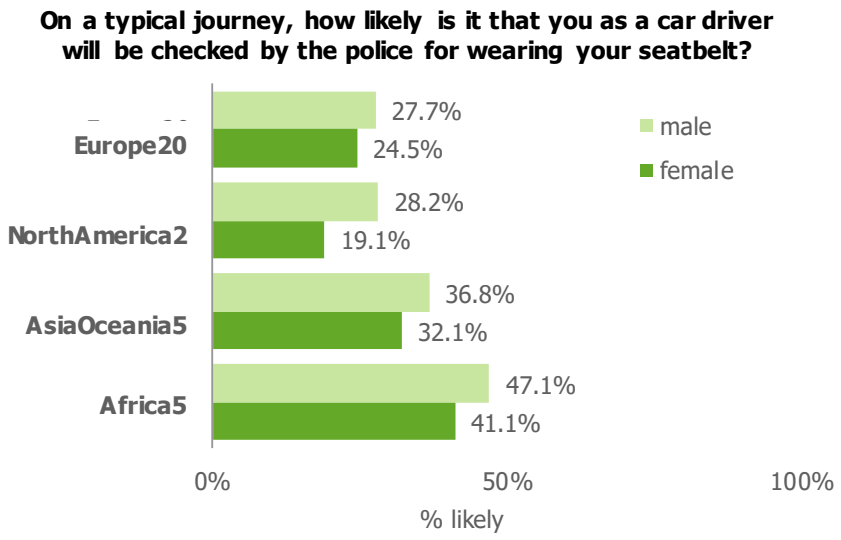

Figure 18: Perceived likelihood of being checked by the police for wearing a seat belt, by gender

Notes: (1) % likely: scores 5 to 7 on a 7-point scale from 1 'very unlikely to 5'very likely'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

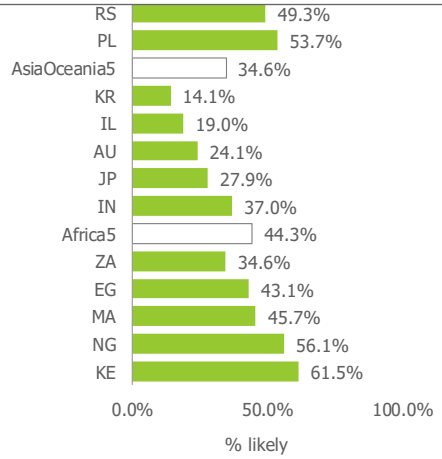

Figure 17: Perceived likelihood of being checked by the police for wearing a seat belt, by country

Notes: (1) % likely: scores 5 to 7 on a 7-point scale from 1 'very unlikely to 5'very likely'. (2) Individual country result is by Individual country weight; Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

1.1.5 Reported perceived likelihood of getting caught for traffic offences

Figure 17 shows the variability in the perceived likelihood of being checked by the police for seat belt use on the national level. The results show large differences in the likelihood between countries, with Finland reporting the lowest likelihood of 10.4% in comparison to the highest likelihood of 61.5% in Kenya. On average, North America has the lowest likelihood with 23.6%, followed by Europe with 26.1%, Asia and Oceania with 34.6%. The highest likelihood is found in the Africa region (44.3%). Despite the high likelihood of being checked by the police for wearing a seat belt, countries in the African and the Asian and Oceanian region still report the highest level of acceptance for not using a seat belt and show the highest self-declared occurrence of driving without a seat belt.

The percentage of the perceived likelihood for being checked by the police for seat belt use is revealed in Figure 18 per gender, and in Figure 19 per age cohort. Figure 18 reveals that the perceived likelihood

of being checked is significantly greater among males than females (X^2 (1, N = 35036) = 76.36, p <0.001). The difference between the male and female perceived likelihood extends from 3.2 percentage points within the European region to 9.1 percentage points within the North American region.

Significant age differences are found for the perceived likelihood of being checked by the police (X^2 (1, N = 35036) = 325.30, p <0.001). As shown in Figure 19, for all regions, the oldest respondents (over 65 years of age) declare the lowest likelihood of being checked by the police for seat belt use. The age group with the highest likelihood varies per region, with the youngest respondents (below 25 years of age) showing the highest percentage within the North American region. Respondents aged between 25 and 34 years report the highest likelihood of being checked (31%) within the European region and respondents aged between 35 and 44 years report the highest likelihood (40%) within the Asian and Oceanian region. The age group with the highest percentage in the African region is 45-64 years.

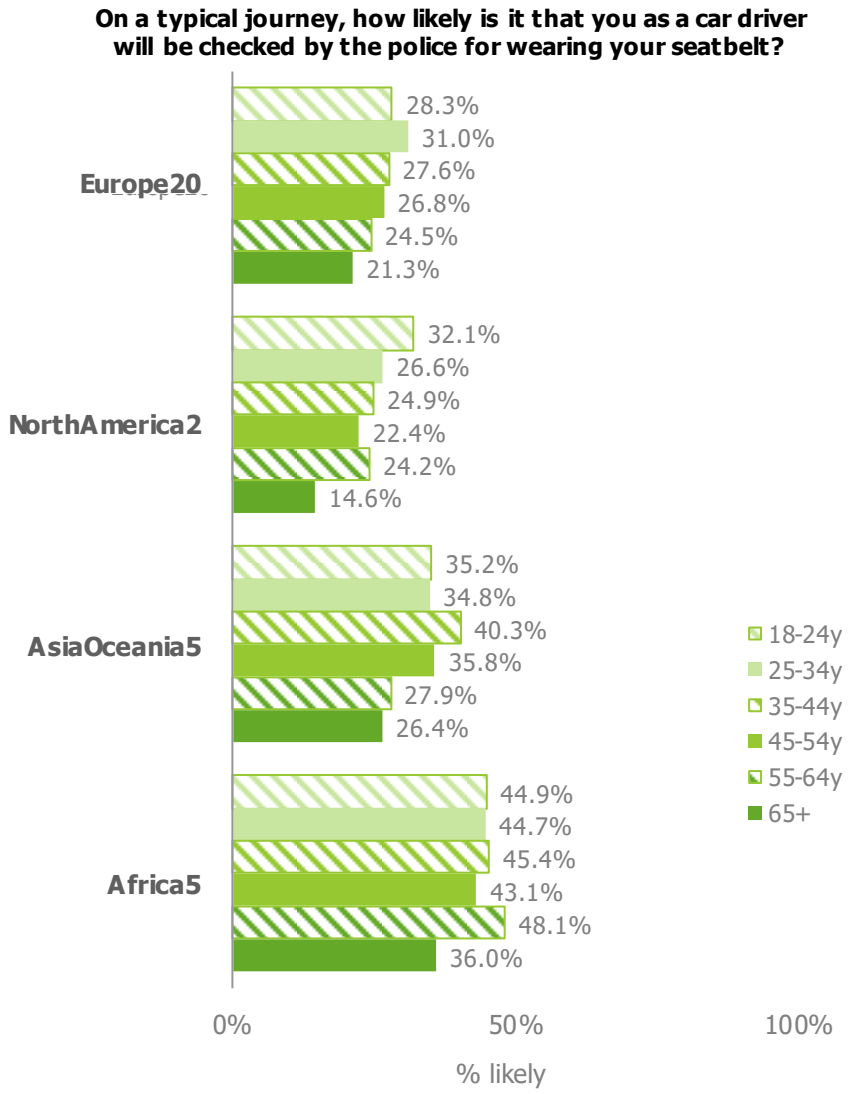

Figure 19: Perceived likelihood of being checked by the police for wearing a seat belt, by age (cohort).

Notes: (1) % likely: scores 5 to 7 on a 7-point scale from 1 'very unlikely to 5'very likely'. (2) Europe20 mean is by Europe20 weight; NorthAmerica2 mean is by NorthAmerica2 weight; AsiaOceania5 mean is by AsiaOceania5 weight; Africa5 mean is by Africa5 weight. (3) all p<0.1.

1.2 Advanced analyses

Previous studies have proven variables such as gender, age, country of residence and road environment to be significant predictors of seat belt use (SARTRE3, 2004; Yannis, 2011). These studies have used logistic regression to analyse the effects of these personal- and environmental parameters on wearing a seat belt while driving. To test the impact of similar variables on seat belt use as a driver, a further logistic regression analysis has been conducted for seat belt use, aiming to confirm results of previous research for the 32 current countries included in this ESRA2 study.

However, limited analyses have been realised for the use of CRS and little is known on which factors impact the propensity to use an appropriate CRS. Besides, in the current study, the descriptive analyses have shown that few respondents find it acceptable to transport children without a proper CRS. However, the descriptive results, as presented in section 3.1 of this report, are based on aggregated

data for gender, age groups, regions and countries. These descriptive results do not provide information on the association between these descriptive variables at an individual level. For that reason, a further analysis has been conducted, aiming to identify the factors that have an impact on the self-declared use of CRS.

By conducting logistic regression analyses, this report intends to quantify the effects of several variables on the propensity to transport children securely by using a CRS, as well as on the propensity to wear a seat belt while driving. Four logistic regression models have been conducted, of which the first two logistic regression analyses (first and second model) have been developed for CRS use, in particular for the question 'Over the last 30 days, how often did you transport children under 150cm without using child restraint systems (e.g. child safety seat, cushion)?'. The final two logistic regression analyses (third and fourth model) have been developed for seat belt use, in particular for the question 'Over the last 30 days, how often did you as a car driver drive without wearing your seat belt?' All logistic regression analyses did not include respondents who never drive a car.

The outcome variable in these models is the dichotomized variable: with a score of 1= 'always use' an appropriate CRS or seat belt and the score of 0= 'at least once drive without' an appropriate CRS or seat belt. The first and third logistic regression models consider the following explanatory variables: socio-demographic variables such as gender, age group and level of education, driving frequency, crash history, acceptability of transporting children without CRS, attitudes towards necessity of using a CRS on short trips, support for policy measures to increase seat belt usage, and perceived likelihood of getting checked by the police for using a seat belt. The second and fourth logistic regression models added the country of residence variable as parameter, in order to explore differences and similarities among the 32 participating countries while controlling for the explanatory parameters tested in the first and third model.

The strength of the effects of the explanatory variables on the outcome variables always using an appropriate CRS and always wearing a seat belt while driving were measured by using odds ratios to represent the effect size and the respective 95% confidence intervals. To assess the goodness of fit of the models, the Hosmer-Lemeshow test was used (Hosmer et al., 2013).

The results for the first model of the logistic regression analysis for CRS use are given in Table 2and can be explained as follows:

- Female respondents are more likely to report that they always secure children under 150 cm when transporting them, in comparison to male respondents. The odds of always using an appropriate CRS is 1.51 times higher when the driver is female instead of male ($p<.001$).
- There is a significant association between age and securing children, revealing that the older drivers self-report a higher likelihood of correctly securing children before transporting them in comparison to the youngest drivers aged below 25 years. Compared to drivers below 25 years of age, the odds of always using CRS increased by 1.39 for the drivers between 25-34 years ($p<.001$), by 1.38 for drivers between 35 and 44 years ($p<.001$), by 1.91 for drivers between 45 and 54 years ($p<.001$), by 2.44 for drivers between 55 and 64 years ($p<.001$), and even by 3.22 ($p<.001$) for the drivers aged 65 years and more.
- A significant relation is found between the level of education and the self-declared CRS use, with drivers who obtained a Bachelor's degree or similar showing a decrease in odds for using CRS, being 0.69 ($p<.01$) times the odds of drivers with only primary education or without education.
- The frequency of driving has a significant effect on the appropriate use of a CRS, with more frequent driving resulting in more self-declared CRS use. Specifically, in comparison to drivers who only drive a few days a year, the odds of always using a CRS increased by 1.53 ($p<.05$) for drivers who drive a few days a month, by 1.84 ($p<.01$) for drivers who drive 1-3 days a week and by 2.39 ($p<.001$) for drivers who drive at least 4 days a week.

Table 2: Logistic regression model for always transporting children under 150cm length by using an appropriate CRS (e.g. child safety seat, cushion) during the last 30 days

	OR (Effect size)	2.50%	97.50%
(Intercept)	0.955		
Gender (reference male)			
Female ***	1.51	1.36	1.66
Age (ref. 18-24)			
Age_6category 25-34***	1.39	1.18	1.65
Age_6category 35-44***	1.38	1.17	1.63
Age_6category 45-54***	1.91	1.58	2.31
Age_6category 55-64***	2.44	1.94	3.05
Age_6category 65+***	3.22	2.58	4.03
Level of education (ref. primary education or no education)			
Secondary education	1.14	0.87	1.51
Bachelor's degree or similar**	0.69	0.53	0.91
Master's degree or high.	0.79	0.59	1.05
Frequency of driving a car (ref a few day a year)			
A few day a month *	1.53	1.01	2.32
1-3 days a week1 **	1.84	1.23	2.76
At least 4 days a week***	2.39	1.61	3.55
Personal acceptability on transporting children in the car without securing them (ref. unacceptable-neutral) ***			
acceptable (4-5)	0.16	0.12	0.22
For short trips, it is not really necessary to use the appropriate child restraint (ref. disagree-neutral)***			
agree (4-5)	0.25	0.21	0.29
have a seat belt reminder system for the front and back seats in new cars (ref. oppose-neutral)***			
support (4-5)	1.48	1.31	1.67
On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for wearing your seat belt (ref. unlikely-neutral) ***			
likely (5-7)	0.72	0.65	0.79

*Notes: *: p<0.05, **: p<0.01, ***: p<0.001*

- The results indicate significant effects of drivers' attitudes on the CRS use. Drivers with a high level of acceptability for transporting children without securing them (OR= 0.16, p<.001) and drivers who report that for short trips it is not necessary to use an appropriate CRS (OR= 0.25, p<.001) are less inclined to always use an appropriate CRS. Also drivers who report a high likelihood of being checked by the police for wearing a seat belt are less inclined to always use an appropriate CRS (OR= 0.72, p<.001).
- The drivers who indicate support for implementing a seat belt reminder system for the front and back seats in new cars are more likely to report that they always use a proper CRS while driving (OR= 1.48, p<.001).

Table 3 shows the results for the logistic second regression model in which the variable 'country' is added as a predictor variable. The odds ratio of each country are presented in Table 3, controlled for

Table 3: Logistic regression model for always transporting children under 150cm length by using an appropriate CRS (e.g. child safety seat, cushion) during the last 30 days – Odds ratio by country

	OR (Effect size)	2.50%	97.50%
AT	3.32	2.23	4.94
AU	6.47	3.67	11.42
BE	2.78	2.01	3.83
CA	2.62	1.74	3.96
CH	3.07	2.04	4.63
CZ	2.62	1.80	3.82
DE	3.84	2.66	5.54
DK	0.92	0.65	1.28
EG	0.65	0.47	0.90
EL	1.37	1.01	1.85
ES	3.10	2.11	4.54
FI	1.50	1.00	2.24
FR	2.27	1.54	3.34
HU	2.85	1.89	4.31
IE	2.84	1.98	4.05
IL	2.48	1.79	3.45
IN	0.70	0.52	0.94
IT	1.92	1.36	2.71
JP	1.65	0.97	2.81
KE	0.62	0.46	0.83
KR	0.50	0.37	0.69
MA	0.63	0.46	0.87
NG	0.67	0.50	0.89
NL	3.79	2.34	6.16
PL	2.42	1.72	3.40
PT	2.40	1.66	3.48
RS	1.75	1.26	2.43
SE	2.58	1.70	3.91
SI	4.13	2.78	6.13
UK	6.10	3.55	10.50
US	4.41	2.79	6.99

the first regression model as presented in Table 2. In this second regression model, South-Africa was used as the reference country, because of its frequency closest to the ESRA average To identify groups of countries with a similar self-declared CRS use, countries were grouped according to the following odds ratios (highlighted using different colours): 0.70 or lower (red); 3.00 or higher (green), between 0.71 and 2.99 (no colour highlight).

The results show that the country of residence has a significant effect on always using appropriate CRS.

In particular, Austria, Australia, Switzerland, Germany, Spain, Netherlands, Slovenia, the United Kingdom and the United States are the countries with the highest odds of 3 or higher, showing that

Table 4: Logistic regression model for always wearing a seat belt as a driver during the last 30 days

	OR	2.50%	97.50%
(Intercept)	0.842		
Gender (reference male)			
Female ***	1.45	1.35	1.55
Age (ref. 18-24)			
Age_6category 25-34	0.94	0.84	1.05
Age_6category 35-44	1.08	0.96	1.22
Age_6category 45-54***	1.23	1.09	1.39
Age_6category 55-64***	1.45	1.28	1.65
Age_6category 65+***	1.75	1.54	2.00
Level of education (ref. primary education or no education)			
Secondary education	1.11	0.95	1.31
Bachelor's degree or similar	1.09	0.92	1.28
Master's degree or high.*	1.20	1.01	1.43
Frequency of driving a car (ref a few day a year)			
A few day a month	1.05	0.76	1.46
1-3 days a week1	1.24	0.90	1.70
At least 4 days a week	1.33	0.97	1.82
In the past 12 months, have you personally been involved in a road crash?*			
yes	0.47	0.44	0.51
Personal acceptability on transporting children in the car without securing them (ref. unacceptable-neutral) ***			
acceptable (4-5)	0.18	0.16	0.21
have a seat belt reminder system for the front and back seats in new cars (ref. oppose-neutral)***			
support (4-5)	1.97	1.83	2.12
On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for wearing your seat belt (ref. unlikely-neutral) ***			
likely (5-7)	0.58	0.54	0.62

*Notes: *: p<0.05, **: p<0.01, ***: p<0.001*

drivers from these countries are more likely to report that they always correctly secure children under 150 cm. On the contrary, Egypt, India, Kenya, the Republic of Korea, Morocco and Nigeria have the lowest odds below 0.7, indicating that the drivers from these countries are less likely to self-declare that they always use an appropriate CRS.

These results are in line with the previous descriptive results revealing that the countries with low odds have the lowest prevalence of CRS use and often no or less stringent legal regulations with regard to the use of CRS.

The results for the third model of the logistic regression analysis for seat belt use are given in Table 4 and can be explained as follows:

- Female respondents are more likely to report that they always wear their seat belt as a driver, in comparison to male respondents. The odds of always using a seat belt is 1.45 times higher in female than in male drivers (p<.001).
- There is a significant association between age and wearing a seat belt, revealing that drivers of 45 years and older self-report a higher likelihood of wearing a seat belt as driver. Compared to drivers below 25 years of age, the odds of always wearing a seat belt while driving increased by 1.23 for drivers between 45 and 54 years (p<.001), by 1.45 for drivers between 55 and 64 years (p<.001), and by 1.75 (p<.001) for the drivers aged 65 years and more.

- A significant relation is found between the level of education and the self-declared seat belt use, with drivers who obtained a Master degree or higher showing an increase in odds for using seat belt by 1.20 (p<.05), compared to drivers with only primary education or without education.
- The frequency of driving had no significant effect on the use of a seat belt as driver.
- Drivers who report to have been involved in a RTC in the past 12 months are less likely to always wear a seat belt while driving, showing a decrease in odds for seat belt use being 0.47 (p<.001) times the odds of drivers who were not involved in a RTC.
- The results indicate significant effects of drivers' attitudes on CRS use for the likelihood to wear a seat belt. Drivers with a high level of acceptability for transporting children without securing them (OR= 0.18, p<.001) are less inclined to always use a seat belt while driving. Also drivers who report a high likelihood of being checked by the police for wearing a seat belt are less inclined to always use a seat belt as driver CRS (OR= 0.58, p<.001).
- The drivers who indicate support for implementing a seat belt reminder system for the front and back seats in new cars are more likely to report that they always use a seat belt while driving (OR= 1.97, p<.001).

Table 5 shows the results for the fourth logistic regression model in which the variable 'country' is added as a predictor variable, controlling for the explanatory variables from the third regression model as presented in Table 4. The effect size is represented in odds ratio for each country and presented in Table 5. In this fourth regression model, Morocco was used as the reference country, because of its frequency closest to the ESRA average To identify groups of countries with a similar self-declared seat belt use, countries were grouped according to the following odds ratios (highlighted using different colours): 0.70 or lower (red); 3.00 or higher (green), between 0.71 and 2.99 (no colour highlight).

The results show that the country of residence has a significant effect on always using a seat belt as driver while driving. In particular, Australia, Israel and Japan are the countries with the highest odds of 3 or higher, showing that drivers from these countries are more likely to report that they always wear a seat belt as a driver. On the contrary, Egypt, Greece, India, Kenya, Nigeria, Serbia and South Africa have the lowest odds below 0.7, indicating that the drivers from these countries are less likely to self-declare that they always use a seat belt while driving. These results are in line with the previous descriptive results revealing that the countries with low odds have the lowest prevalence of seat belt use and often less stringent enforcement with regard to legal seat belt regulations.

1.3 Comparison with other findings

1.3.1 Comparison of ESRA self-declared behaviour on seat belt and IRTAD seat belt wearing rates

The behaviour of road users and their attitudes towards road safety are generally investigated and compared within a specific country or region, because cross-country studies with comparisons on a global level are more complex due to differences in the possibility to measure and investigate behaviour and attitudes of road users, as well as a variety of methodologies used in different countries (ETSC, 2014; ITF, 2017). There are several types of data collection methods that can be applied to investigate the behaviour of road users, for example the prevalence rates of traffic behaviours can be based on objective observational data or on subjective answers given by road users on their traffic behaviour. International data of observational roadside surveys from various countries, used to monitor traffic behaviour, are collected by the International Traffic Safety Data and Analysis Group (IRTAD) and bundled in a yearly Road Safety report. The latest rates reported by the International Transport Forum (ITF) estimate the car occupants' seat belt use via roadside counts on specific locations with combined observational counts from motorways, urban- and rural areas (ITF, 2017). . A limitation of roadside observations is the low measurement frequency due to the high costs involved in roadside observation studies. On the contrary, the ESRA2 survey described in this report is measuring the road users' self-declared behaviour, which has the advantage of a cost-reduced methodology. Another advantage of ESRA2 is the shared methodology applied to collect data for 32 countries in four regions (Europe, North America, Africa, as well as Asia and Oceania). This methodological commonality offers the opportunity

Table 5: Logistic regression model for always wearing a seat belt as a driver during the last 30 days – Odds ratio by country

	OR (Effect size)	2.50%	97.50%
AT	1.58	1.21	2.07
AU	4.52	3.12	6.55
BE	1.93	1.49	2.50
CA	1.72	1.28	2.32
CH	1.40	1.06	1.86
CZ	1.03	0.78	1.37
DE	2.04	1.57	2.65
DK	2.21	1.62	3.02
EG	0.26	0.19	0.34
EL	0.53	0.41	0.69
ES	1.87	1.39	2.52
FI	1.16	0.87	1.55
FR	2.05	1.51	2.79
HU	0.74	0.57	0.98
IE	2.31	1.68	3.19
IL	3.52	2.52	4.92
IN	0.52	0.40	0.68
IT	0.86	0.66	1.12
JP	3.21	2.24	4.61
KE	0.29	0.23	0.38
KR	1.32	1.00	1.76
NG	0.34	0.26	0.44
NL	2.22	1.61	3.05
PL	1.01	0.77	1.32
PT	2.04	1.52	2.75
RS	0.70	0.54	0.91
SE	1.53	1.13	2.06
SI	1.48	1.12	1.96
UK	2.80	1.98	3.97
US	1.42	1.07	1.88
ZA	0.47	0.36	0.60

to make an international comparison of self-declared seat belt and CRS use across a great number of countries.

In this chapter, the self-declared seat belt use rates for the ESRA2 countries, as described in chapter 3.1, are compared with the observed seat belt use rates during the roadside observations according to IRTAD, which can be found in Table 6. The type of methodology is mentioned in Table 6, describing the users whose seat belt use rates are measured. Table 6 includes the year in which the last roadside observation has been conducted for all countries. Some countries have measurements from the year 2013 or before, but these outdated rates are adjusted with the latest available rates (IRTAD, 2017; IRTAD, 2018; WHO, 2018).

Table 6: IRTAD roadside observation rates for seat belt use per country – including measurement features and car occupant selection criteria

Country	last available year	% for driver	% for passenger in front seat (% for passenger and driver)	% for passenger in rear seat	% for children
AT	2016	95%	96%	88%	98%
AU	2016	-	-	95%	-
BE	2015	91.5%	92.2%	85.5%	23%/87% (using seat belt correctly/ Both correct or incorrect use of seat belt)
CA	2016	98%	(97.5%)	-	-
CH	2017	95%	93%	84%	
CZ	2015	95%	95%	98%	
DE	2017	98%	99%	97%	93%
DK	2016	96%/96% (urban/rural)	(96%)	91%	
EG	N.A.	-	-	-	-
EL	2009	77%	74%	23%	-
ES	2012	90%	91%	81%	-
FI	2016	96%	96%	85%	-
FR	2017	-	-	82%/90% (urban/rural)	88%/93% (urban/rural)
HU	2017	91%	83% (2015)	52%	79 % (2015)
IE	2017	96%	96%	83%	-
IL	2016	91.2%	88.7%	69.7%	50%/87% (using correctly/ correctly or incorrectly used)
IN	N.A.	-	-	-	-
IT	2015-2016	-	63%	11%	43%
JP	2017	99%	95%	36%	64%
KE	N.A.	-	-	-	-
KR	2017	94%	86%	49%	60%/49% (motorway/urban)
MA	2017	60%/72% (urban/rural)	57%/65% (urban/rural)	35%	-
NG	2014	-	80%	1%	-
NL	N.A.	-	-	-	-
PL	2016	93%	95%	83%	93%
PT	2013	-	96%	77%	94%
RS	2017	76%	78%	12%	48%/27% (0-3y/4-12y)
SE	2016	98%	96%	93% (2015)	98% (2015)
SI	2016	90%	92%	69%	93%/88% (0-7y/8-14y)
UK	2014	97.9%	96%	87.1%	90.7% (under 14y)
US	2016	90.5%	88.6%	73% (2014)	-
ZA	2010	4.5%	5%	-	-

Sources: IRTAD, 2017; IRTAD, 2018

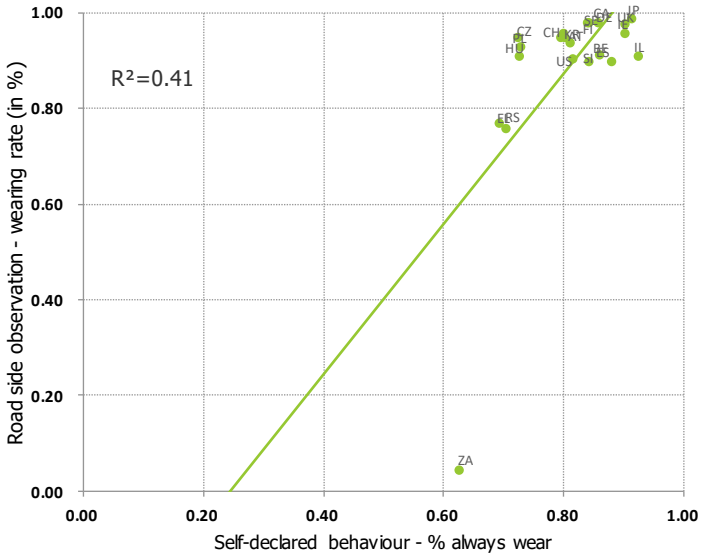

Figure 20: Relationship between the drivers' self-declared seat belt use and drivers' seat belt wearing rates measured via roadside observations.

data. A significant correlation is found between IRTAD observations and ESRA2 results both for seat belt use of the drivers' and that of the passengers'.

For drivers seats, the correlation between IRTAD wearing rates and ESRA2 percentages on self-declared behaviour is significant (R^2= 0.41; p= .002, r=0.64). The relationship between the two different measures is visualized in Figure 20. There are several countries with a rather large difference between the self-declared seat belt wearing rate and observed wearing rate. The countries with the highest variability between the two types of measures are Czech Republic, Hungary, Poland and especially South Africa. For example, for Czech Republic, the seat belt wearing rate among drivers is 95% according to IRTAD, while only 72% of the respondents in ESRA2 answered that they always wear a seat belt as a driver. Besides, 62% of the respondents from South-Africa self-declared to always use a seat belt while driving, but only 5% of drivers have been observed to actually wear their seat belt during roadside observations (ITF, 2017). In line with this, the Road Traffic Management Corporation's (RTMC) traffic offence survey which was conducted in South-Africa in 2010 also noted a much higher seat belt wearing rate of 33% (WHO, 2018). An interesting result is that almost all countries self-declare a lower wearing rate in compared to the objective rate estimated by roadside observations. The correlation line in Figure 20 also shows that for higher seat belt rates across most countries the correlation is plotted above the perfect correlation. Only respondents from South Africa are self-declaring higher rates in comparison to reality. The extremely low observed wearing rates of South Africa could have reduced the correlation and South Africa was suggested to be removed as outlier. However, after removing the outlier country South Africa, the correlation reduces (R^2=0.33; r=0.57) and does not increase. This reduction in correlation could be explained by South-Africa being an influential outlier. The influential outlier South-Africa has a large positive influence on the regression and the steepness of the slope of the regression line, leading to an increase in the correlation coefficient. For that reason, this study decided to remain South-Africa into the regression analysis. The influential impact of South Africa might be explained by this outlier confirming the general trend among most countries in this analysis, revealing high variability between objective observations and subjective self-declared rates.

Among the countries studied for passengers on the rear seats, the correlation between self-declared ESRA2 results and previously estimated seat belt use via roadside observations is displayed in Figure 21. The correlation is significant with a Pearson correlation coefficient (r) of 0.82 (p<.001). For the majority of the countries, the rates according to IRTAD are slightly higher than the self-declared seat belt rates found in this ESRA2. Figure 21 shows that the correlation for most countries is plotted above the perfect correlation lineAs visible from Table 7, the results of the current ESRA2 survey revealed improvement for the countries reporting a lower CRS use in the SARTRE3 survey in 2004. For instance,

Table 7: Comparison between current ESRA2 results and SARTRE3 results for CRS or seat belt use when transporting children

Country	SARTRE3 results	ESRA2 results	
	Always transport children wearing a seat belt or appropriate CRS	Always transport children with seat belt or appropriate CRS	Transport children without seat belt or appropriate CRS at least once during the last 30 days
UK	97%	80%	20%
DE	96%	88%	12%
DK	96%	80%	20%
FI	95%	86%	14%
SE	94%	88%	12%
FR	93%	89%	11%
AT	90%	88%	12%
CH	89%	89%	11%
IE	88%	89%	11%
NL	84%	89%	11%
PL	81%	82%	18%
BE	81%	87%	13%
HU	81%	86%	14%
SI	77%	92%	8%
ES	75%	87%	13%
PT	72%	87%	13%
IT	72%	82%	18%
EL	68%	79%	21%
CZ	60%	87%	13%
Average % for all countries	83.6%	86.1%	

Notes: ESRA2 results are showing the average % of the use of CRS for children under 150cm of height and the use

in the ESRA2 survey, an average of 87% of the respondents from Czech Republic self-declared to have always used a CRS or a seat belt when transporting children during the last 30 days, while only 60% were found in SARTRE3. Also in Greece, ESRA2 results reveal that 79% of the respondents self-declared to have always used a CRS while the percentage in SARTRE3- was 68%. The improvement in CRS use among these countries can be explained by more attentions to this specific safety measure in national traffic safety campaigns or stricter enforcements of existing CRS laws by police. For example, the SARTRE3 report showed that in Greece, a country with relatively low seat belt compliance, the enforcement was not intense or strict, despite the existing laws for the use of seat belts and CRS (SARTRE, 2004). This finding is confirmed by the WHO safety performance report, revealing a score of 2 out of 10 for the enforcement of CRS use in Greece (WHO, 2018).

On the contrary, the countries with higher CRS rate in 2004 in the SARTRE3 currently self-declared less use of CRS; for example, United Kingdom, Germany, Denmark , Finland , Sweden , France and Austria. It should be mentioned that SARTRE3 results were obtained through face-to-face interviews and ESRA2, via an online panel. Answers related to self-reported behaviours are vulnerable to the social desirability bias that tends to be more pronounced in face-to-face surveys than in online surveys.

However, no significant differences between the average rates of ESRA2 and SARTRE3 for all countries suggest that over time, the self-reported use of an appropriate CRS has not significantly changed. In addition, the correlation between the rates for CRS use reported in the current ESRA2 results and the

SARTRE3 results from 2004 has been visualized in Figure 22. (R^2= 0.004; p= .809, r=0.059). ESRA2 results are found not to be related to SARTE3 results and should be interpreted independently.

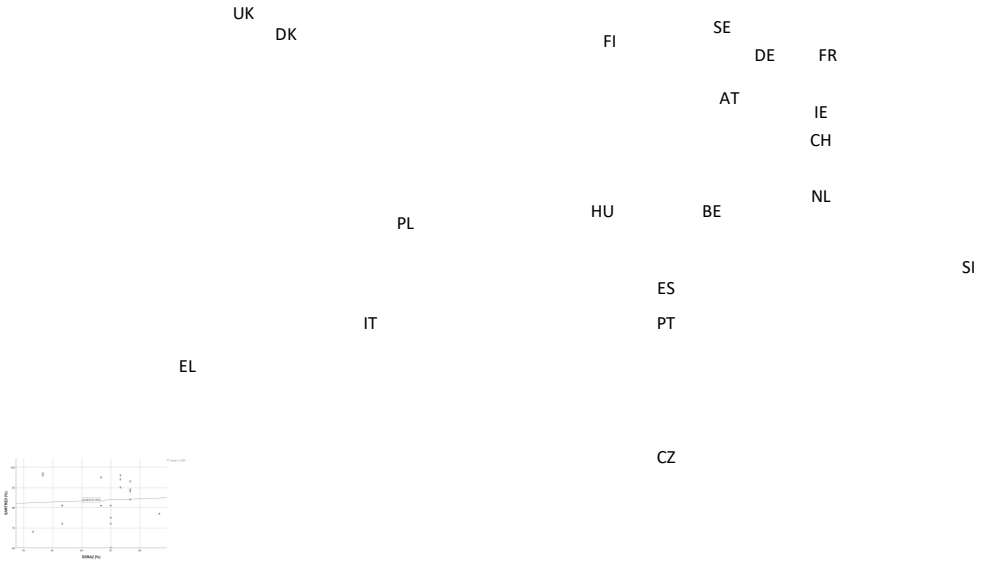

Figure 21: Relationship between self-declared rates in CRS use per country, measured with the ESRA2 survey versus the SARTRE3 survey.

1.4 Limitations of the data

A limitation of the ESRA2 data is the effect of cultural differences between the various countries across four global regions. The survey is translated in many different national languages, but countries from Europe, America, Africa or Asia and Oceania might have different cultural interpretations of the questions in the survey or even other cultural ways of answering a survey.

Additionally, despite the advantages of online surveys, the representativeness of the surveyed populations may be a problem, mainly for countries with low rates of internet use. That is the case of some of the countries of ESRA2 survey where the percentage of population using the internet is low (lower than 30% in Kenya and Nigeria, and lower than 50% in India and Egypt). The number of African respondents aged 65 or older was quite low, so that the answers of this particular age group in African countries cannot be considered to be representative.

Summary and discussion

The World Health Organisation (WHO) points out that not using a seat belt and not using a CRS while driving are two out of the top five behavioural reasons that increase the risk of traffic related injury or fatality (WHO, 2015). To significantly reduce the risk of crash related fatality or serious injury for car occupants, the use of a seat belt while driving and an appropriate use of a Child Restraint System (CRS) play a vital role as a traffic safety measure (SWOV, 2012). However, worldwide, different regulations apply for the obligation to wear a seat belt or use a CRS and also great variety in seat belt and/or CRS use is found among countries.

As a follow-up to the ESRA1 project (Meesmann et al., 2017) and the previous ESRA1 thematic report (Trotta et al., 2016), this ESRA2 thematic report provides data on the attitudes and beliefs of road users on wearing seat belts and the use of proper child restraint systems from 32 countries of four global regions (20 European, 2 American, 5 African and 5 countries from the Asian and Oceanian region).

As reported by the SARTRE3, a common trend was previously found among many European countries, revealing higher rates for seat belt use by car occupants driving in front seats in comparison to rear seats. The results of this thematic report show that internationally, it is more acceptable when a car occupant is not wearing a seat belt in comparison to a car driver who is not using an appropriate CRS to transport children. On a regional level, Europe has the lowest acceptance for driving without a seat belt with 4% acceptance on average. North America is the region with the lowest acceptance for not using an appropriate CRS, with 1% acceptance on average. The highest acceptance both of driving without a seat belt and not using a CRS is found within the African region.

Not only the country of residence reveals significant differences between the levels of acceptance for both seat belt and CRS use, significant differences were also found across gender and age cohorts. Females are less likely to accept driving without a seat belt or without an appropriate CRS when transporting children than males. Furthermore, the oldest respondents are showing lower acceptance for not wearing a seat belt and not properly using a CRS in comparison to the youngest.

Despite the relatively low levels of acceptability for not using a seat belt, the self-declared global seat belt use rates remain low. However, on a national level, great differences can be seen between countries, with higher rates of seat belt use in the front seats compared to the rear seats of a car. Europe shows the highest seat belt use for drivers, and North America for passengers in the back seats. The lowest drivers' seat belt rate is self-declared within the African region and the passengers' seat belt use rate in the rear seats is lowest within Asia and Oceania. For the CRS use, the highest rates are self-declared within the North American region, and the lowest within Africa. Females declare higher seat belt use, as do the oldest respondents.

The effects of gender, age and other explanatory variables on the propensity to always wear a seat belt as a driver and always use an appropriate CRS, were studied in this report using logistic regression analyses. The results revealed that females are more likely to declare that they always use an appropriate CRS and wear a seat belt while driving, in comparison to males. Furthermore, the older the drivers, the more likely they were to declare that they always use a CRS while transporting children and always wear a seat belt as a driver. Higher frequency of driving has positive effects on CRS use, but no effect on seat belt use. However, drivers who reported to have been involved in a RTC in the last year, are less likely to wear a seat belt while driving. Moreover, respondents with a Bachelor degree reveal reduced odds to always use a CRS, but respondents with a Master degree or higher show increased odds to always wear a seat belt as a driver, both in comparison to respondents with no education or solely primary education.

Particularly interesting is the finding that African respondents report the highest likelihood of being checked by the police and that they are at the same time very supportive of stricter regulations and safety policy measures related to seat belt use. However, African respondents also report the lowest seat belt use and the highest acceptability for not wearing a seat belt while driving. Nevertheless, the African respondents are rather an exception in comparison to respondents from other regions, because for the other regions it is found that drivers who find it acceptable to transport children without securing

them, who find it not really necessary to use a CRS for short trips, and who perceive it as likely to be checked by the police, have a lower self-declared likelihood of always using an appropriate CRS or wear a seat belt as a driver.

Furthermore, the results show that respondents in all 32 participating countries agree that the traffic policy with respect to seat belt use could be stricter, with more than 65% support for the legal obligation to have a seat belt reminder system for the front and rear seats in new cars. In line with this, a positive relation has been found between the support of this safety policy measure and an increased probability to use a seat belt as a driver and increased odds for appropriate CRS use.

In conclusion, seat belt and CRS use differ according to the country and global region. Therefore, this issue should be tackled both on a national and on a global level. On a national level the low seat belt use rates could be increased by stricter law enforcement and improved safety policy measures, especially since the majority of the respondents are in favour of improved and tougher safety policy measures. However, as a common safety policy recommendation, global awareness campaigns on seat belt use and appropriate use of the CRS are required in order to change the beliefs that these safety measures are unnecessary on short drives, by emphasizing the protecting benefits of wearing a seat belt while driving and using an appropriate CRS while transporting children.

The initial aim of ESRA was to develop a system for gathering reliable and comparable information about people's attitudes towards road safety in a number of European countries. This objective has been achieved and the initial expectations have even been exceeded. ESRA has become a global initiative which already conducted surveys in 46 countries across six continents. The outputs of the ESRA project have become building blocks of national and international road safety monitoring systems.

The ESRA project has also demonstrated the feasibility and the added value of joint data collection on road safety attitudes and performance by partner organizations in a large number of countries. The intention is to repeat this initiative on a triennial basis, retaining a core set of questions in every wave allowing the development of time series of road safety performance indicators.

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Appendix 1: ESRA2_2018 Questionnaire

Introduction

In this questionnaire, we ask you some questions about your experience with, and your attitudes towards traffic and road safety. When responding to a question, please answer in relation to the traffic and road safety situation in [COUNTRY]. There are no right or wrong answers; what matters is your own experience and perception. Thank you for your contribution!

Socio-demographic information

Q1) In which country do you live? _____

Q2) Are you ... male – female – other (only in country who officially recognizes another gender)

Q3a) In which year were you born? Dropdown menu

Q3b) In which month were you born? Dropdown menu

Q4_1) What is the highest qualification or educational certificate that you have obtained? none - primary education - secondary education - bachelor's degree or similar - master's degree or higher

Q4_2) What is the highest qualification or educational certificate that your mother has obtained? none - primary education - secondary education - bachelor's degree or similar - master's degree or higher - I don't know

Q5a) Which of the following terms best describes your current professional occupation? white collar or office worker (excluding executive)/employee (public or private sector) →Q5b - blue collar or manual worker/worker →Q5b - executive →Q5b - self-employed/independent professional →Q5b - currently no professional occupation →Q5c

Q5b) Do you have to drive or ride a vehicle for work? (Please indicate the job category that is most appropriate for you) yes, I work as a taxi, bus, truck driver, … - yes, I work as a courier, mailman, visiting patients, food delivery, salesperson, … - no

Q5c) You stated that you currently have no professional occupation. Which of the following terms best describes your current situation? I am … a student - unemployed, looking for a job – retired - not fit to work - a stay-at-home spouse or parent - other

Q6) What is the postal code of the municipality in which you live? _____

Q7) In which region do you live? Drop down menu

Q8a) How far do you live from the nearest bus stop, light rail stop, or metro/underground station? less than 500 metres → Q8b - between 500 metres and 1 kilometre → Q8b - more than 1 kilometre → skip Q8b

Q8b) What is the frequency of your nearest bus stop, light rail stop, or metro/underground station? at least 3 times per hour - 1 or 2 times per hour - less than 1 time per hour

Mobility & exposure

Q9) Do you have a car driving licence or permit (including learner's permit)? yes - no

Q10) During the past 12 months, how often did you use each of the following transport modes in [country]? How often did you ...? at least 4 days a week - 1 to 3 days a week - a few days a month - a few days a year - never
Items (random): walk minimum 100m (pedestrian; including jogging, inline skate, skateboard, …) - cycle (non-electric) - cycle on an electric bicycle/e-bike/pedelec - drive a moped (≤ 50 cc or ≤ 4 kW; non-electric - drive a motorcycle (> 50 cc and > 4 kW non-electric) - drive an electric moped (≤ 4 kW) - drive an electric motorcycle (> 4 kW) - drive a powered personal transport device such as an electric step, hoverboard, solowheel,… - drive a car (non-electric or non-hybrid) - drive a taxi - drive a bus as a driver - drive a truck/lorry - drive a hybrid or

electric car - take a taxi or use a ride-hail service (e.g. Uber, Lyft) - take the train - take the bus - take the tram/streetcar - take the subway - take the aeroplane - take a ship/boat or ferry - be a passenger in a car - use another transport mode

Q11) Over the last 30 days, have you transported a child (<18 years of age) in a car? yes - no
Items: below 150cm - above 150cm

Self-declared safe and unsafe behaviour in traffic

Q12_1a) Over the last 12 months, how often did you as a CAR DRIVER …?
You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- drive after drinking alcohol
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- read a text message or email while driving

Q12_1b) Over the last 30 days, how often did you as a CAR DRIVER …?
You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- drive when you may have been over the legal limit for drinking and driving
- drive after drinking alcohol
- drive 1 hour after using drugs (other than medication)
- drive after taking medication that carries a warning that it may influence your driving ability
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- drive faster than the speed limit on motorways/freeways
- drive without wearing your seat belt
- transport children under 150cm without using child restraint systems (e.g. child safety seat, cushion)
- transport children over 150cm without wearing their seat belts
- talk on a hand-held mobile phone while driving
- talk on a hands-free mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving
- drive when you were so sleepy that you had trouble keeping your eyes open

Q12_2) Over the last 30 days, how often did you as a CAR PASSENGER …? You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Item:

- travel without wearing your seat belt in the back seat

Q12_3) Over the last 30 days, how often did you as a MOPED DRIVER OR MOTORCYCLIST …? You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- ride when you may have been over the legal limit for drinking and driving
- ride faster than the speed limit outside built-up areas (but not on motorways/freeways)
- ride a moped or motorcycle without a helmet
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while riding a moped or motorcycle

Q12_4) Over the last 30 days, how often did you as a CYCLIST …? You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- cycle when you think you may have had too much to drink
- cycle without a helmet
- cycle while listening to music through headphones
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while cycling
- cycle on the road next to the cycle lane

Q12_5) Over the last 30 days, how often did you as a PEDESTRIAN …? You can indicate your answer on a scale from 1 to 5, where 1 is "never" and 5 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- listen to music through headphones as a pedestrian while walking in the streets
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while walking in the streets
- cross the road when a pedestrian light is red
- cross the road at places other than at a nearby (distance less than 30m) pedestrian crossing

Acceptability of safe and unsafe traffic behaviour

Q13_1) Where you live, how acceptable would most other people say it is for a CAR DRIVER to….? You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) – unacceptable/neutral (1-3)
Items (random):

- drive when he/she may be over the legal limit for drinking and driving
- drive 1 hour after using drugs (other than medication)
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- not wear a seat belt while driving
- transport children in the car without securing them (child's car seat, seat belt, etc.)
- talk on a hand-held mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving

Q14_1) How acceptable do you, personally, feel it is for a CAR DRIVER to…? You can indicate your answer on a scale from 1 to 5, where 1 is "unacceptable" and 5 is "acceptable". The numbers in between can be used to refine your response.
Binary variable: acceptable (4-5) – unacceptable/neutral (1-3)
Items (random)

- drive when he/she may be over the legal limit for drinking and driving
- drive 1 hour after using drugs (other than medication)
- drive after taking a medication that may influence the ability to drive
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- drive faster than the speed limit on motorways/freeways
- not wear a seat belt while driving
- transport children in the car without securing them (child's car seat, seat belt, etc.)
- talk on a hand-held mobile phone while driving
- talk on a hand-free mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving
- drive when they're so sleepy that they have trouble keeping their eyes open

Attitudes towards safe and unsafe behaviour in traffic

Q15) To what extent do you agree with each of the following statements? You can indicate your answer on a scale from 1 to 5, where 1 is "disagree" and 5 is "agree". The numbers in between can be used to refine your response.
Binary variable: agree (4-5) – disagree/neutral (1-3)
Items (random):
Normative believes & subjective norms (including injunctive norms from Q13)

- Most of my friends would drive after having drunk alcohol.
- Most of my friends would drive 20 km/h over the speed limit in a residential area.

Behaviour believe & attitudes

- For short trips, one can risk driving under the influence of alcohol.

- I have to drive fast; otherwise, I have the impression of losing time.
- Respecting speed limits is boring or dull.
- For short trips, it is not really necessary to use the appropriate child restraint.
- I use a mobile phone while driving, because I always want to be available.
- To save time, I often use a mobile phone while driving.

Perceived behaviour control (here: self-efficacy)

- I trust myself to drive after having a glass of alcohol.
- I have the ability to drive when I am a little drunk after a party
- I am able to drive after drinking a large amount of alcohol (e.g. half a liter of wine).
- I trust myself when I drive significantly faster than the speed limit.
- I am able to drive fast through a sharp curve.
- I trust myself when I check my messages on the mobile phone while driving.
- I have the ability to write a message on the mobile phone while driving.
- I am able to talk on a hand-held mobile phone while driving.

Habits

- I often drive after drinking alcohol.
- Even when I am a little drunk after a party, I drive.
- It sometimes happens that I drive after consuming a large amount of alcohol (e.g. a liter of beer or half a liter of wine).
- I often drive faster than the speed limit.
- I like to drive in a sporty fast manner through a sharp curve.
- It happens sometimes that I write a message on the mobile phone while driving.
- I often talk on a hand-held mobile phone while driving.
- I often check my messages on the mobile phone while driving.

Intentions

- I will do my best not to drive after drinking alcohol in the next 30 days.
- I will do my best to respect speed limits in the next 30 days.
- I will do my best not to use my mobile phone while driving in the next 30 days.

Quality control items

- Indicate number 1 on the answering scale.
- Indicate number 4 on the answering scale.

Subjective safety & risk perception

Q16) How safe or unsafe do you feel when using the following transport modes in [country]? You can indicate your answer on a scale from 0 to 10, where 0 is "very unsafe" and 10 is "very safe". The numbers in between can be used to refine your response.
Items (random) = Items indicated by the respondent in Q10 are displayed.

Q17) How often do you think each of the following factors is the cause of a road crash involving a car? You can indicate your answer on a scale from 1 to 6, where 1 is "never" and 6 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable: often/frequently (4-6) - not that often/not frequently (1-3)
Items (random)

- driving after drinking alcohol
- driving after taking drugs (other than medication)
- driving faster than the speed limit
- using a hand-held mobile phone while driving
- using a hands-free mobile phone while driving
- inattentiveness or day-dreaming while driving
- driving while tired

Support for policy measures

Q18) Do you oppose or support a legal obligation to …? You can indicate your answer on a scale from 1 to 5, where 1 is "oppose" and 5 is "support". The numbers in between can be used to refine your response.
Binary variable: support (4-5) – oppose/neutral (1-3)
Items (random)

- install an alcohol "interlock" for drivers who have been caught drunk driving on more than one occasion (technology that won't let the car start if the driver's alcohol level is over the legal limit)
- have zero tolerance for alcohol (0,0 ‰) for novice drivers (licence obtained less than 2 years)
- have zero tolerance for alcohol (0,0 ‰) for all drivers

- install Intelligent Speed Assistance (ISA) in new cars (which automatically limits the maximum speed of the vehicle and can be turned off manually)
- install Dynamic Speed Warning signs (traffic control devices that are programmed to provide a message to drivers exceeding a certain speed threshold)
- have a seat belt reminder system for the front and back seats in new cars
- require all cyclists to wear a helmet
- require cyclists under the age of 12 to wear a helmet
- require all moped drivers and motorcyclists to wear a helmet
- require pedestrians to wear reflective material when walking in the streets in the dark
- require cyclists to wear reflective material when cycling in the dark
- require moped drivers and motorcyclists to wear reflective material when driving in the dark
- have zero tolerance for using any type of mobile phone while driving (hand-held or hands-free) for all drivers
- not using headphones (or earbuds) while walking in the streets
- not using headphones (or earbuds) while riding a bicycle

Q19_1) What do you think about the current traffic rules and penalties in your country for driving or riding under the influence of alcohol? agree – disagree
Items:

- The traffic rules should be stricter.
- The traffic rules are not being checked sufficiently.
- The penalties are too severe.

Q19_2) What do you think about the current traffic rules and penalties in your country for driving or riding faster than the speed limit? agree – disagree
Items: Q19_1

Q19_3) What do you think about the current traffic rules and penalties in your country for using a mobile phone while driving or riding? agree – disagree
Items: Q19_1

Enforcement

Q20_1) On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for... You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.
Binary variable: likely (5-7) – unlikely/neutral (1-4)
Items (random)

- … alcohol, in other words, being subjected to a Breathalyser test
- … the use of illegal drugs
- … respecting the speed limits (including checks by a police car with a camera, fixed cameras, mobile cameras, and section control systems)
- … wearing your seat belt
- … the use of hand-held mobile phone to talk or text while driving

Q21_1) In the past 12 months, how many times have you been checked by the police for using alcohol while DRIVING A CAR (i.e., being subjected to a Breathalyser test)? never – 1 time – at least 2 times - I prefer not to respond to this question
Binary variable: at least once - never (removing "I prefer not to respond to this Q)

Q22_1) In the past 12 months, how many times have you been checked by the police for the use of drugs (other than medication) while DRIVING A CAR? never – 1 time – at least 2 times - I prefer not to respond to this question
Binary variable: at least once - never (removing "I prefer not to respond to this Q)

Involvement in road crashes

Introduction: The following questions focus on road crashes. With road crashes, we mean any collision involving at least one road vehicle (e.g., car, motorcycle, or bicycle) in motion on a public or private road to which the public has right of access. Furthermore, these crashes result in material damage, injury, or death. Collisions include those between road vehicles, road vehicles and pedestrians, road vehicles and animals or fixed obstacles, road and rail vehicles, and one road vehicle alone.

Q23_1a) In the past 12 months, how many times have you personally been involved in road crashes in which you or somebody else had to be taken to the hospital? ___ times (number; max. 10) if 0 → Q23_2a; if >0 → Q23_1b → Q23_2a
Binary variable: at least once - never

Q23_1b) Please indicate the transport modes you were using at the time of these crashes.
Items indicated by the respondent in Q10 are displayed; Threshold = 'at least a few days a year'.
Number to be indicated after each transport mode; note the sum should be equal to the number indicated in Q23_1a

Q23_2a) In the past 12 months, how many times have you personally been involved in road crashes with only minor injuries (no need for hospitalisation) for you or other people? ___ times (number; max. 10) if 0 → Q23_3a; if >0 → Q23_2b → Q23_3a
Binary variable: at least once - never

Q23_2b) = Q23_1b

Q23_3a) In the past 12 months, how many times have you personally been involved in road crashes with only material damage?
___ times (number; max. number 10) if 0 → skip Q23_3b; if >0 → Q23_3b → next Q
Binary variable: at least once - never

Q23_3b) = Q23_1b

Vehicle automation

I2) Introduction: The following questions focus on your opinion about automated passenger cars. We talk about two different levels of vehicle automation:
Semi-automated passenger cars: Drivers can choose to have the vehicle control all critical driving functions, including monitoring the road, steering, and accelerating or braking in certain traffic and environmental conditions. These vehicles will monitor roadways and prompt drivers when they need to resume control of the vehicle.
Fully-automated passenger cars: The vehicle controls all critical driving functions and monitoring all traffic situations. Drivers do not take control of the vehicle at any time.

Q24) How interested would you be in using the following types of automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "not at all interested" and 7 is "very interested". The numbers in between can be used to refine your response.
Binary variable: interested (5-7) - not interested/neutral (1-4)
Items:

- semi-automated passenger car
- fully-automated passenger car

Q25_1) How likely do you think it is that the following benefits will occur if everyone would use a semi-automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.
Binary variable: likely (5-7) – unlikely/neutral (1-4)
Items (random):

- fewer crashes
- reduced severity of crash
- less traffic congestion
- shorter travel time
- lower vehicle emissions
- better fuel economy
- time for functional activities, not related to driving (e.g. working)
- time for recreative activities, not related to driving (e.g. reading, sleeping, eating)

Q25_2) How likely do you think it is that the following benefits will occur if everyone would use a fully-automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.

Items (random) = Q25_1

Bonus question to be filled in by national partner

Q26) .....? You can indicate your answer on a scale from 1 to 5, where 1 is "...." and 5 is "....". The numbers in between can be used to refine your response.
Items (random; 4 items)

Q27) .....? You can indicate your answer on a scale from 1 to 5, where 1 is "...." and 5 is "....". The numbers in between can be used to refine your response.
Items (random; 4 items)

Social desirability scale

Introduction: The survey is almost finished. The following questions have nothing to do with road safety, but they are important background information. There are no good or bad answers.

Q28) To what extent are the following statements true? You can indicate your answer on a scale from 1 to 5, where 1 is "very untrue" and 5 is "very true". The numbers in between can be used to refine your response.
Items (random):

- I always respect the highway code, even if the risk of getting caught is very low.
- I would still respect speed limits at all times, even if there were no police checks.
- I have never driven through a traffic light that had just turned red.
- I do not care what other drivers think about me.
- I always remain calm and rational in traffic. (if needed pop-up: rational = non-emotional)
- I am always confident of how to react in traffic situations.

Appendix 2: ESRA2 weights

The following weights are used to calculate representative means on national and regional level. They are based on UN population statistics (United Nations Statistics Division, 2019). The weighting took into account small corrections with respect to national representativeness of the sample based on gender and six age groups (18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+). For the regions, the weighting also took into account the population size of each country in the total set of countries from this region.

Individual country weight	Individual country weight is a weighting factor based on the gender*6 age groups (18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y) distribution in a country as retrieved from the UN population statistics.
Europe20 weight	European weighting factor based on all 20 European countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
NorthAmerica2 weight	North American weighting factor based on all 2 North American countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
AsiaOceania5 weight	Asian and Oceanian weighting factor based on all 5 Asian and Oceanian countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
Africa5 weight	African weighting factor based on all 5 African countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
ESRA32 weight	ESRA32 weighting factor based on all 32 countries participating in ESRA2_2018, considered individual country weight and population size of the country as retrieved from the UN population statistics.
ESRA32_sample weight	ESRA32-sample weighting factor based on all 32 countries participating in ESRA2_2018, considered individual country weight with N=1000 in all countries.

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